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DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE
DOMINION EXPERIMENTAL FARMS

EXPERIMENTAL STATION

LACOMBE, ALBERTA

INTERIM REPORT OF THE SUPERINTENDENT
F. H. REED, B.S.A.

FOR THE YEAR 1921



Sows on Summer Pasture, Experimental Station, Lacombe, Alberta.

OTTAWA
F. A. ACLAND
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1922

EXPERIMENTAL STATION, LACOMBE, ALBERTA.

REPORT OF THE SUPERINTENDENT, F. H. REED, B.S.A.

SEASONAL NOTES

The amount of moisture received in 1921 was 15.215 inches, which is 2.147 inches below the average of 17.362 inches for the fourteen years 1908 to 1921 inclusive. The precipitation for the six growing months, April 1 to September 30, equalled 11.895 inches, which is 1.572 inches below the average for that period.

The amount of snow received during the months of January and February was below the average; however, this was more than compensated for by the moisture received during March, April, and May, which totalled 2.3 inches above the average for the same period. This made plenty of moisture available for germination of the spring cereals.

Owing to 20 inches of snow which fell during April 3 and 4, seeding was not possible until April 21; thus, spring operations were one week later in starting than the average of the past fourteen years.

Starting on May 12, a prolonged period of practically arid conditions prevailed, which lasted for a period of forty-seven days, during which only 1.28 inches precipitation was received in light showers, and during which the highest temperature in the history of this Station was recorded. For this reason, the hay crop was very light and pastures became dry and short; the maturing of the grain was hastened considerably, with the result that all early maturing grain was short in the straw and ripened prematurely.

This period of drought was broken on June 28, and during the following eight days 1.92 inches precipitation was received. While this was too late to help the hay crop and increase the length of straw in the early grain, it helped fill the early grain and assured good yields from the later seeded fields.

August was an ideal harvest month. The weather continued dry until the beginning of the second week in September, when there was a week of cloudy weather during which 1.41 inches of rain fell. This was followed by the driest period of the season. Starting on September 13, there was only 0.91 inch precipitation during the remaining ninety-nine days of the year. This continued dry weather allowed the threshing to be finished in good time with little damage to the crop due to weathering.

The 3.6 degrees of frost which occurred during the night of August 25-26 slightly damaged some of the late maturing grain. This, added to the high price prevailing for green feed, as compared with the falling price for grains, caused many farmers to harvest their late oats for green feed.

Owing to the absence of moisture in the soil in the fall, ploughing was still possible in November; and, although conditions necessitated the use of considerable extra power, at least 30 per cent of the land is ready for spring seeding.

METEOROLOGY

SUMMARY OF WEATHER REPORTS FOR FOURTEEN YEARS

The town of Lacombe is situated about 115 miles north of Calgary and about 80 miles south of Edmonton on the Calgary-Edmonton trail, and is served by that branch of the Canadian Pacific Railway. Quoting the Dictionary of Altitudes in the Dominion of Canada (second edition), the Canadian Pacific Railway station is at an elevation of 2,795 feet above sea-level, and its situation is $52^{\circ} 28'$ latitude and $113^{\circ} 44'$ longitude.

The Dominion Experimental Station is situated about one mile southwest of the Canadian Pacific Railway station and adjoins the Lacombe townsite. The land, some 490 acres, is the southeast and southwest quarters of section twenty-four and the northwest quarter and a small portion of the northeast quarter of section thirteen, township forty, range twenty-seven, west of the fourth meridian.

The topography of the district is a series of broad, fertile valleys. These valleys become broader and shallower towards the east until the open prairie is reached, about fifty miles. Towards the west, these valleys become narrower and the land rougher as the foothills grade into the mountains. The same kind of country extends, with slight variations, northward throughout the entire Edmonton district, and southward as far as Calgary. The rolling land is all situated in or comprises the park belt. Brush, light willow and buffalo brush, starts on the outer margin near the prairie and gradually grades into bluffs of poplar and then into the heavier timber towards the mountains.

The climate between Edmonton and the Peace River district is very similar to other parts of central Alberta and is not as severe as would be expected. This is due to the influence of two factors: the elevation of the Grand Prairie district is approximately 300 feet lower than the Lacombe district, which tends to give that district a warmer climate than could be expected; the low altitude of the range of mountains to the westward of the Peace River district permits the proximity of the Pacific ocean to affect the climate of that district more than any other part of the province.

The winter weather of central Alberta is somewhat further modified by the warm Chinook winds that extend northward from the southern part of the province. These winds, while seldom warm enough to remove the snow, are a big factor in modifying the climate for a considerable distance east of the mountains and north beyond Edmonton.

The meteorological instruments at the Lacombe Experimental Station are situated on a gentle slope with a southeastern aspect. While there are no official instruments registering the temperatures at the apex of the hills and at the bottoms of the valleys, the damage by late spring and early fall frosts is more noticeable in the valleys than at this Station, while killing frosts are noticed here that do no damage on the higher elevations. There is little doubt that there is as wide range of temperature between that which obtains at the highest and lowest points within a radius of ten miles of this Station as there is between the mean temperatures of Calgary and Edmonton, possibly including Peace River and Fort Vermilion.

The factors enumerated in the foregoing paragraphs will emphasize the point that the meteorological data compiled at this Station may be taken as a fairly safe criterion of what may be expected over the greater part of central Alberta, and thus be a guide to intending settlers, or to those who are already farming here, in planning their crops and cultural methods.

As the soil in central Alberta is suitable for any type of diversified farming, the problems in agriculture are nearly all the result of climatic limitations. For that

reason, all farming operations should be adapted to obtain maximum results under these conditions. As many new settlers are arriving with the intention of following mixed farming in a territory unfamiliar to them, they should make a careful study of the climatology of the district and adapt their farming operations to its limitations.

Meteorological observations have been taken at this Station since 1908, and, although the period covered is comparatively short, a summary of the data obtained will give a general knowledge of the climatic conditions prevailing over central Alberta during the past and will form a basis for judgment as to what may be expected in the future. This knowledge of the climate of the district is of importance, for upon the general weather conditions prevailing throughout the year, and particularly during the growing season, depends the kinds and, in a large measure, the quantity and quality of the crops produced.

The outstanding meteorological observations recorded since the inauguration of this Station are as follow:—

The heaviest shower on record occurred on January 21, 1911, when 1.15 inches precipitation fell in twenty minutes; while the heaviest rainfall occurred on April 14, 1918, amounting to 2.4 inches; this was succeeded by 2.2 inches on the following day, making a total of 4.6 inches precipitation received in a two-day rain.

The heaviest snowstorm occurred on January 24, 1918, when 21 inches of snow fell in one storm.

The variation in the amount of precipitation received from year to year has been from 21.84 inches in 1912 to 12.415 inches in 1920, the average for the fourteen years being 17.362 inches.

The growing season is favoured with 77.57 per cent of the annual precipitation, which occurs as follows: April, 7.15 per cent; May, 11.28 per cent; June, 21.14 per cent; July, 16.09 per cent; August, 12.9 per cent; September, 9.01 per cent.

The highest temperature recorded occurred on July 20, 1921, when 94.6° was registered. The lowest temperature on record, -56.1° , was registered on January 7, 1909.

July has the highest and January has the lowest mean temperature. July, 1920, is the hottest month on record; while January, 1909, is the coldest month on record.

The year 1914 has the highest and 1909 the lowest average monthly mean temperature.

July has an average of 9.37 hours sunshine per day, while January has only 2.73 hours.

The average number of days on which precipitation is received is greatest in June, that month having 12.6 days; while November and December are least, with only 3.5 days each.

The factors that were responsible for the bumper crop of 1915 may be of interest to many. The precipitation in 1914 was slightly above normal and allowed the soil to be put in good condition for spring seeding. The greatest influence was exerted by the timely rains in 1915; the spring opened with just enough moisture for good germination, and the crops made growth enough to make best use of and not be injured by the heavy rains which fell in June and July. The precipitation in June amounted to 8.485 inches, while July had 3.37 inches. This was followed by the hottest and, with the exception of August, 1920, the driest August in the history of this Station. This made conditions especially favourable for ripening the cereals, as there was an abundance of available moisture in the soil to complete the development of the crop. The season was exceptional in that no frosts occurred between April 28 and September 11; which gives 1915 the longest growing season on record.

MONTHLY PRECIPITATION AT THE DOMINION EXPERIMENTAL STATION,
LACOMBE, ALBERTA

Month	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921
January....	0.2	0.72	0.73	0.55	0.76	0.93	1.45	0.295	0.4	0.75	5.3	0.21	1.34	0.68
February...	0.97	0.3	0.59	0.48	0.20	1.15	1.0	0.025	1.38	0.52	0.06	0.818	0.40	0.42
March.....	1.06	0.345	0.33	1.01	0.13	0.81	0.8	0.075	0.52	0.33	0.30	0.77	0.905	1.39
April.....	0.259	0.275	0.04	1.15	1.26	0.15	0.34	0.32	0.60	1.24	4.6	2.30	2.23	2.61
May.....	2.912	2.63	1.73	1.51	2.92	0.48	1.285	1.245	2.045	3.262	0.94	3.14	1.62	1.69
June.....	8.215	2.24	3.87	5.62	3.00	2.98	6.07	8.485	3.570	1.49	1.47	1.029	1.495	1.85
July.....	2.1	4.28	1.35	4.39	5.29	3.43	1.11	3.37	4.311	1.13	1.24	2.321	1.52	3.275
August.....	2.37	0.91	2.61	2.63	4.44	2.435	1.10	0.84	5.218	1.885	3.93	1.635	0.38	0.98
September...	0.305	0.43	1.00	2.50	1.27	0.59	2.36	1.833	3.055	2.043	1.125	2.33	1.56	1.49
October...	0.40	1.05	0.24	0.62	1.56	0.68	0.30	0.533	0.40	1.363	0.015	0.64	0.715	0.0
November...	0.0	0.37	0.51	0.78	0.93	0.05	1.5	0.3	1.013	0.0	1.20	1.18	0.01	0.6
December...	0.25	0.82	0.3	0.19	0.08	0.07	0.98	0.0	0.4	1.3	0.725	0.62	0.24	0.23
	19.041	14.37	13.30	21.43	21.84	13.755	18.295	17.321	22.91	15.313	20.905	16.993	12.415	15.215

COMPARISON OF THE MONTHLY PRECIPITATION IN 1921 WITH THAT RECEIVED
DURING THE YEARS 1908 TO 1921 INCLUSIVE

Month	Precipitation 1921	Average Precipitation 1908-1921	1921— Amount above Average	1921— Amount below Average	Number of Years above 1921	Number of Years below 1921	Average Precipitation ex- pressed in %
January.....	0.68	1.02	.....	0.34	8	5	5.88
February.....	0.42	0.594	.....	0.174	8	5	3.42
March.....	1.39	0.627	0.663	.....	13	0	3.61
April.....	2.61	1.241	1.369	.....	1	12	7.15
May.....	1.69	1.958	0.268	.....	6	7	11.28
June.....	1.85	3.67	.....	1.82	9	4	21.14
July.....	3.275	2.794	0.481	.....	6	7	16.09
August.....	0.98	2.24	.....	1.36	10	3	12.9
September.....	1.49	1.564	.....	0.074	7	6	9.01
October.....	0.0	0.608	.....	0.608	13	0	3.5
November.....	0.6	0.603	.....	0.003	6	7	3.47
December.....	0.23	0.443	.....	0.213	9	4	2.55

MONTHLY MEAN TEMPERATURES AT THE DOMINION EXPERIMENTAL STATION,
LACOMBE, ALBERTA

Month	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921
January....	17.60	-7.8	11.5	-7.28	5.6	0.67	9.3	15.2	13.5	5.8	6.97	21.5	5.07	8.59
February...	16.60	-0.6	1.55	9.46	19.55	12.11	8.9	17.4	16.90	3.1	11.11	12.69	19.67	17.81
March.....	14.94	15.55	2.8	29.36	19.37	18.5	26.65	27.84	23.79	20.3	14.45	28.77	19.18	19.94
April.....	10.3	31.1	43.79	35.09	41.85	42.2	40.1	47.56	40.94	31.9	41.19	42.86	25.85	37.5
May.....	51.0	49.1	49.29	47.15	49.8	46.81	47.89	51.44	45.65	46.9	46.0	48.08	44.92	48.75
June.....	54.9	55.45	58.2	57.03	59.19	56.97	55.81	52.10	53.3	53.6	52.32	56.43	54.53	58.97
July.....	61.0	55.2	58.2	56.40	56.66	57.65	62.25	51.46	59.53	61.8	61.54	60.02	64.09	60.57
August.....	56.45	57.95	54.6	53.57	57.7	57.6	58.1	63.78	55.2	58.5	59.29	58.68	59.65	57.82
September...	50.1	44.1	47.78	47.7	46.41	50.9	51.2	36.78	48.0	49.2	52.33	50.4	50.94	46.4
October...	41.1	42.95	41.21	38.9	39.24	35.55	47.1	42.02	38.1	36.1	42.9	27.9	39.67	45.09
November...	32.3	17.3	21.25	15.73	30.45	29.25	35.58	24.28	26.3	39.0	30.58	14.7	25.54	18.6
December...	25.45	10.95	15.61	14.7	21.8	20.0	11.3	5.53	6.5	3.21	16.24	12.92	14.53	13.0
Average...	36.01	30.94	33.85	33.15	37.32	35.68	37.85	36.27	35.64	34.12	36.25	36.25	35.30	36.09

COMPARISON OF THE MONTHLY MEAN TEMPERATURES OF 1921 WITH THOSE WHICH WERE ATTAINED DURING THE YEARS 1908 TO 1921 INCLUSIVE

Month	Mean Temperature 1921	Average Mean Temperature 1908-1921	1921 Amount above Average	1921 Amount below Average	Number of Years above 1921	Number of Years below 1921
January.....	8.59	7.59	1.0	.....	6	7
February.....	17.81	11.87	5.94	.....	2	11
March.....	19.94	20.10	.....	0.16	6	7
April.....	37.5	36.59	0.91	.....	8	5
May.....	48.75	48.06	0.69	.....	5	8
June.....	58.97	55.63	3.34	.....	1	12
July.....	60.57	59.06	1.51	.....	5	7
August.....	57.82	57.78	0.04	.....	7	6
September.....	46.4	48.02	.....	1.62	10	3
October.....	45.09	39.85	5.24	.....	1	12
November.....	18.6	25.78	.....	7.18	10	3
December.....	13.0	13.57	.....	0.57	8	5
Average.....	36.09	35.32	.....	.....	.....	.....

MONTHLY MINIMUM TEMPERATURES AT THE DOMINION EXPERIMENTAL STATION, LACOMBE, ALBERTA

Month	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921
January....	-20.1	-56.1	-24.1	-47.5	-46.0	-35.6	-36.1	-25.0	-52.0	-49.8	-44.1	-4.6	-50.3	-30.1
February...	-18.1	-47.6	-38.0	-39.2	-23.5	-24.1	-41.6	-6.5	-29.0	-45.7	-41.6	-40.6	-15.6	-23.1
March.....	-17.6	-21.2	-5.5	-3.7	-20.0	-21.1	-23.6	-1.0	-28.0	-14.9	-35.6	-38.1	-29.6	-33.1
April.....	-5.0	3.9	16.7	22.3	17.9	17.4	14.7	14.0	17.9	5.9	3.9	21.4	-24.1	1.4
May.....	27.3	16.9	-13.8	-11.9	23.5	18.1	24.3	32.0	19.9	12.9	18.9	12.4	23.4	22.4
June.....	30.4	30.8	26.7	36.9	25.5	22.9	13.7	32.0	28.8	27.9	26.4	27.9	26.9	29.8
July.....	35.7	37.6	32.4	33.9	30.4	31.9	39.3	35.0	38.3	29.8	32.9	30.4	31.9	29.9
August.....	26.5	29.4	31.9	29.5	30.0	35.4	33.9	41.0	28.9	30.9	32.7	31.9	34.4	28.4
September	14.4	23.9	19.5	21.5	20.8	24.4	23.5	16.1	23.4	23.9	25.4	17.4	24.1	20.4
October...	0.1	9.8	7.0	8.9	13.6	9.7	20.0	10.0	16.9	8.4	9.7	-10.6	9.4	14.0
November...	-5.1	-19.0	-2.6	-21.6	2.9	-0.5	-18.0	-8.5	-18.1	11.4	4.9	-34.6	-6.1	-25.1
December...	-31.5	-21.0	-22.1	-37.6	-10.6	-13.3	-18.0	-12.0	-42.2	-42.1	-8.7	-38.6	-30.1	-37.2

COMPARISON OF THE MONTHLY MINIMUM TEMPERATURES IN 1921 WITH THOSE WHICH WERE REGISTERED IN THE YEARS 1908 TO 1921

Month	Minimum Temperature 1921	Average Minimum Temperature 1908-1921	1921 Amount above Average	1921 Amount below Average	Number of Years above 1921	Number of Years below 1921
January.....	-30.1	-37.24	7.14	.....	4	9
February.....	-23.1	-31.01	7.91	.....	3	10
March.....	-33.1	-20.93	.....	12.17	11	2
April.....	1.4	9.16	.....	7.76	11	2
May.....	22.4	18.14	4.26	.....	5	8
June.....	29.8	27.61	2.19	.....	4	9
July.....	29.9	33.53	.....	3.63	12	1
August.....	28.4	31.77	.....	3.37	12	1
September...	20.4	21.34	.....	0.94	9	4
October.....	14.0	9.06	4.94	.....	2	11
November.....	-25.1	-10.0	.....	15.1	12	1
December.....	-37.2	-26.07	.....	11.13	9	4

MONTHLY MAXIMUM TEMPERATURES AT THE DOMINION EXPERIMENTAL
STATION, LACOMBE, ALBERTA

Month	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921
January....	48.8	35.0	46.9	40.0	42.4	45.3	46.1	40.8	27.9	42.8	46.8	48.8	43.8	49.8
February..	55.6	47.2	41.1	43.6	52.8	55.6	48.6	42.8	62.7	44.7	47.8	51.6	48.8	55.3
March.....	54.6	47.5	65.6	59.6	54.8	52.1	64.0	64.8	59.7	48.3	63.8	50.3	54.8	51.8
April.....	71.6	58.3	77.8	76.0	65.8	77.8	72.6	76.8	71.8	58.8	71.8	77.4	50.8	63.1
May.....	84.6	81.3	81.5	83.4	82.7	77.4	77.1	76.3	71.8	75.8	78.8	88.9	76.0	75.9
June.....	79.2	80.0	89.7	80.0	89.6	81.8	84.8	75.8	77.9	83.3	83.8	90.3	89.3	83.8
July.....	86.4	82.8	85.1	85.0	78.3	84.8	87.6	79.8	82.8	85.8	92.6	92.6	90.7	94.6
August.....	86.4	86.5	82.8	80.0	84.5	84.0	85.8	88.6	82.9	85.8	89.8	91.6	91.9	87.3
September	85.8	84.5	80.3	76.0	75.8	80.0	80.3	74.3	76.8	82.2	81.8	79.1	86.3	77.0
October...	74.8	76.1	77.0	80.5	70.6	81.5	77.0	74.2	74.7	72.8	75.8	72.6	78.0	82.8
November	69.8	53.6	43.4	46.0	58.3	59.8	58.8	50.8	57.0	69.6	56.3	54.0	59.3	62.3
December.	42.6	46.0	47.8	45.8	58.6	57.8	43.8	48.8	44.0	47.8	45.8	49.8	45.6	47.0

COMPARISON OF THE MONTHLY MAXIMUM TEMPERATURES IN 1921 WITH THOSE
WHICH WERE REGISTERED DURING THE YEARS 1908 TO 1921 INCLUSIVE

Month	Maximum Tempera- ture 1921	Average Maximum Tempera- ture 1908 to 1921	1921 Amount above Average	1921 Amount below Average	Number of Years above 1921	Number of Years below 1921
January.....	49.8	43.23	6.57	.....	0	13
February.....	55.3	49.87	5.43	.....	3	10
March.....	51.8	56.55	.....	4.65	11	2
April.....	63.1	67.31	.....	4.21	10	3
May.....	75.9	79.39	.....	3.49	11	2
June.....	83.8	83.54	0.26	.....	5	7
July.....	94.6	86.35	7.25	.....	0	13
August.....	87.3	86.28	1.02	.....	4	9
September.....	77.0	80.01	.....	3.01	9	4
October.....	82.8	76.31	6.49	.....	0	12
November.....	62.3	57.07	5.23	.....	2	11
December.....	47.0	47.16	.....	0.16	6	7

MONTHLY HOURS DURATION OF SUNSHINE AT THE DOMINION EXPERIMENTAL
STATION, LACOMBE, ALBERTA

Months	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921
January....	117.5	116.9	115.6	68.6	103.5	63.3	73.5	70.0	89.0	73.8	57.2	74.2	91.0	72.1
February..	115.1	191.0	155.0	152.1	119.3	103.2	120.1	109.8	131.9	119.1	119.7	100.7	146.2	99.8
March.....	141.0	171.8	202.9	166.4	203.7	164.1	153.8	163.9	129.0	184.1	191.6	156.1	149.7	122.2
April.....	219.0	213.0	212.1	227.4	196.2	260.8	174.2	214.8	201.1	150.8	236.3	205.2	100.3	234.8
May.....	202.8	199.4	287.7	231.8	235.9	277.1	291.9	130.1	179.3	208.3	195.8	231.0	217.8	229.1
June.....	201.9	313.7	297.0	247.8	304.0	271.9	218.7	179.6	198.1	255.8	259.7	284.9	264.5	284.4
July.....	314.3	300.0	325.2	267.9	177.1	336.3	316.8	239.4	229.5	348.7	296.9	259.0	354.3	302.6
August.....	292.4	325.2	249.3	231.9	177.7	311.1	265.3	298.9	253.0	254.4	254.4	245.0	263.7	251.0
September	217.7	227.1	193.7	176.6	175.2	240.4	172.9	170.2	176.0	175.3	212.9	188.0	202.0	184.5
October...	112.2	143.5	165.3	176.4	147.5	141.7	120.6	144.7	138.6	123.6	157.2	197.7	155.1	171.6
November	133.3	113.5	51.9	107.8	88.5	146.2	84.8	121.0	122.0	162.9	118.5	102.1	94.1	87.6
December.	133.3	90.3	71.4	86.7	74.2	136.7	66.1	83.4	94.3	53.7	60.2	97.4	84.5	99.7
Totals.....	2200.5	2405.4	2327.1	2141.4	2002.8	2452.8	2058.7	1925.8	1941.8	2110.5	2148.3	2041.3	2123.2	2139.4

COMPARISON OF THE MONTHLY HOURS DURATION OF SUNSHINE IN 1921 WITH
THOSE WHICH WERE REGISTERED DURING THE YEARS 1908 TO 1921 INCLUSIVE

Month	Hours Sunshine Duration, 1921	Average Hours Duration Sunshine, 1908-1921	1921 Amount above Average	1921 Amount below Average	Number of Years above 1921	Number of Years below 1921	Average Daily Sunshine Duration, Hours
January.....	72.1	84.73	.....	12.63	9	4	2.73
February.....	99.8	127.36	.....	37.56	13	0	4.55
March.....	122.2	164.31	.....	42.11	13	0	5.3
April.....	234.8	203.29	31.51	.....	2	11	6.77
May.....	229.1	222.71	6.39	.....	5	8	7.18
June.....	284.4	255.86	28.54	.....	4	9	8.53
July.....	302.6	290.57	12.93	.....	6	7	9.37
August.....	251.0	261.51	.....	10.51	7	6	8.44
September.....	184.5	193.75	.....	9.25	7	6	6.46
October.....	171.6	142.55	29.05	.....	1	12	4.6
November.....	87.6	109.57	.....	21.97	11	2	3.65
December.....	99.7	87.99	11.71	.....	2	11	2.84
Totals.....	2,139.4	2,144.2	.....	.....	.....	.....	.....

NUMBER OF DAYS ON WHICH PRECIPITATION OCCURRED DURING EACH MONTH
AT THE DOMINION EXPERIMENTAL STATION, LACOMBE, ALBERTA

Month	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	Average
January.....	6	13	6	11	9	10	7	3	2	4	5	3	11	5	6.8
February.....	7	9	8	7	4	6	7	0	8	3	2	6	6	6	5.7
March.....	9	7	4	8	3	6	5	2	4	2	1	7	5	10	5.2
April.....	4	4	2	9	9	2	5	2	7	5	2	5	11	6	5.2
May.....	15	13	9	8	14	8	6	12	16	11	7	6	9	6	10.0
June.....	19	11	12	15	9	13	17	20	13	9	9	12	9	8	12.6
July.....	9	11	8	20	17	11	9	14	11	5	6	6	9	18	11.0
August.....	14	5	13	13	13	14	3	4	12	11	16	10	3	7	9.9
September.....	6	3	6	10	8	4	8	10	6	7	4	3	8	5	6.3
October.....	6	8	4	5	6	3	2	8	7	6	1	4	5	1	4.7
November.....	0	5	6	9	5	1	2	3	2	6	1	6	1	2	3.5
December.....	1	8	6	5	3	0	6	0	3	4	3	4	3	2	3.5
Totals.....	96	97	84	120	100	78	77	78	91	73	57	72	80	76	84.4

MONTHLY AVERAGES FOR THE PERIOD 1908 TO 1921 INCLUSIVE

Month	Precipitation		Number of Days on which Precipita- tion fell	Hours Sunshine		Temperatures		
	Inches	Per cent.		Per Month	Per Day	True Mean	Average Maximum	Average Minimum
January.....	1.02	5.88	6.8	84.73	2.73	7.59	43.23	-37.24
February.....	0.594	3.42	5.7	127.36	4.55	11.87	49.87	-31.01
March.....	0.627	3.61	5.2	164.31	5.3	20.10	56.55	-20.93
April.....	1.241	7.15	5.2	205.29	6.77	36.59	67.31	9.16
May.....	1.958	11.28	10.0	222.71	7.18	48.06	79.39	18.14
June.....	3.67	21.14	12.6	255.86	8.53	55.63	83.54	27.61
July.....	2.794	16.09	11.0	290.57	9.37	59.06	86.35	33.53
August.....	2.24	12.9	9.9	251.51	8.44	57.78	86.28	31.77
September.....	1.564	9.01	6.3	193.75	6.46	48.02	80.01	21.34
October.....	0.608	3.5	4.7	142.55	4.6	39.85	76.31	9.06
November.....	0.603	3.47	3.5	109.57	3.65	25.78	57.07	-10.0
December.....	0.443	2.55	3.5	87.99	2.84	13.57	47.16	-26.07

YEARLY TOTALS FOR THE YEARS 1908 TO 1921 INCLUSIVE

Year	Precipitation	Number of Days on which Precipitation fell	Sunshine Hours Duration	Average of Monthly Means
1908.....	19.041	96	2,200.5	36.01
1909.....	14.370	97	2,405.4	30.94
1910.....	13.30	84	2,327.1	33.85
1911.....	21.43	120	2,141.4	33.15
1912.....	21.84	100	2,002.8	37.32
1913.....	13.755	78	2,452.8	35.68
1914.....	18.295	77	2,058.7	37.85
1915.....	17.321	78	1,925.8	36.27
1916.....	22.91	91	1,941.8	35.64
1917.....	15.313	73	2,110.5	34.12
1918.....	20.905	57	2,148.3	36.25
1919.....	16.993	72	2,041.3	36.25
1920.....	12.415	80	2,123.2	35.30
1921.....	15.215	76	2,139.4	36.09
Average.....	17.362	84.4	2,144.2	35.32

PRECIPITATION

To the farmer and stockman the two most important data are the records of precipitation and temperature. Of these two, the precipitation is by far the more important for farmers in this district, as upon the amount and the date on which it occurs depends to a large extent the yield and the ease with which the crop is harvested, as well as the quality of the crop when marketed.

The records of the precipitation at Lacombe show some interesting features. The variation from year to year has been considerable, and ranges from the highest, 21.84 inches in 1912, to the lowest, 12.415 inches in 1920, while the average for the fourteen years is 17.362 inches. The heaviest precipitation occurs during the growing season; the precipitation for the six growing months, April to September inclusive, amounting to 77.57 per cent of the total. June, with 21.14 per cent, receives the most of any month during the year, and December the least, with 2.55 per cent, there being a gradual decline in the monthly precipitation from June to December, and, with the exception of January, a gradual increase from December to June.

In considering the number of days per month on which precipitation occurred, one might infer that the growing months are cloudy and damp; however, this is not the case, as shown by the hours' duration of sunshine per month. The months during which the most precipitation occurs also receive the most sunshine and have the highest mean temperature. This is made possible by the fact that during the growing season nearly all the precipitation is received in showers which are followed by bright sunshine.

SUNSHINE.

July has the highest average daily sunshine, with 9.37 hours, while January has the least, with an average of 2.73 hours. It must not be inferred from these figures that there are only 2.73 hours sunshine between sunrise and sunset in January. The occurrence of clouds during the day affect the amount of sunshine received to a considerable extent.

The yearly average duration of sunshine is 2,144.2 hours. The least sunshine recorded in one year was registered in 1915, when 1,925.8 hours were registered, while 1913 had the most, with a total of 2,452.8 hours.

An interesting point in studying these records is the fact that our coldest weather is always accompanied by bright, sunny days. This is illustrated best in January and February, 1909. In 1909, January had a mean temperature of -7.8 degrees and 116.9 hours sunshine. This gives that month 32.17 hours sunshine above the average, while the mean temperature is 15.39 degrees below the average. The mean temperature of February, 1909, of -0.6 degrees, is 12.47 degrees below the average, while the sunshine, 191 hours, is 63.64 above the average hours for that month.

TEMPERATURES

July is the hottest month in the year, with an average mean temperature of 59.06 degrees; August is the second hottest month, with a mean temperature of 57.79 degrees; while June is a close third, with 55.63 degrees. May and September are very similar, May having a mean temperature of 48.06 degrees and September 48.02 degrees. October is 3.26 degrees warmer than April, the mean temperature for October being 39.85 degrees, against 36.59 degrees for April. January is the coldest month, having a mean temperature of 7.59 degrees, February is second with 11.87 degrees, followed by December with 13.57 degrees, March with 25.78 degrees, and November with 20.10 degrees.

Although July has the highest average mean temperature, it does not necessarily follow that this month has the highest maximum temperature every year. In 1909, 1912, and 1915 this was not the case. Apparently, if the amount of precipitation is above normal, the mean temperature is lowered.

The highest temperature recorded at this Station was registered on July 20, 1921, when the maximum thermometer reached 94.6 degrees, which is 7.25 degrees above the average maximum temperature for that month.

The following averages give a fair estimate of the maximum temperatures that may be expected each month: January, 43.23 degrees; February, 49.87 degrees; March, 56.55 degrees; April, 67.31 degrees; May, 79.39 degrees; June, 83.84 degrees; July, 86.35 degrees; August, 86.28 degrees; September, 80.01 degrees; October, 76.31 degrees; November, 57.07 degrees; December, 47.16 degrees.

The lowest temperature on record at this Station was registered on January 7, 1909, when the temperature dropped to -56.1 degrees, which is 18.86 degrees below the average minimum temperature for that month.

The following temperatures, which are the average of the minimum temperatures for the past fourteen years, are an indication of the lowest temperatures that may be expected each month: January, -37.24 degrees; February, -31.01 degrees; March, -20.93 degrees; April, 9.16 degrees; May, 18.14 degrees; June, 27.61 degrees; July, 33.53 degrees; August, 31.77 degrees; September, 21.34 degrees; October, 9.06 degrees; November, -10.0 degrees; December, -26.07 degrees.

The above temperatures are significant in that, with many of the more tender crops, they are the limiting factor in production. It will be seen that July is the only month that can be expected to be free from frost; as it was, frost was registered in four years out of the fourteen, with a slight trace on two other occasions. A slight frost occurred during June every year, with the exception of 1911 and 1915; while August was without frost during five years out of the fourteen. The year 1915 was particularly free from frost, as none occurred between April 28 and September 11.

In presenting the dates of the different farm operations, the complete data of 1921 only are given. This will give those who are not familiar with this district a fairly accurate idea of the dates on which the different operations take place. However, it must be borne in mind in studying these figures that the spring of 1921 was from seven to ten days later than usual in opening up; while ploughing, owing to the absence of moisture in the soil, was possible for a considerably longer period than usual in the fall.

The dates of seeding and harvesting the different staple crops are presented in the following summary, which is a review of the data compiled during the fifteen years variety tests have been conducted at this Station.

Marquis wheat has been seeded as early as March 31 (1910) and as late as May 1 (1907 and 1917); eight of these seedings occurred between the dates April 10 and 15. The date of cutting varied from August 20 (1919) to September 16 (1916); seven of these cuttings occurred between the dates August 28 and September 3.

With Banner oats, the date of seeding varied from April 11 (1910) to May 15 (1920); while during ten different years the seeding was done between April 10 and 25. The earliest harvest began on August 15 (1921), while the latest harvest of Banner on record began on September 19 (1911); seven harvests began between the dates August 21 and August 29.

Manchurian barley has been seeded between April 11 and May 16 throughout the past fifteen years, while harvest began between the dates August 15 and September 6 during the same period. This indicates that the period during which barley can be seeded with satisfactory results is longer than that which obtains for any other cereal.

Golden Vine peas have been seeded between the dates April 11 (1917) and May 15 (1909); the dates of seeding vary uniformly between those dates. Harvest has begun between the dates of August 21 (1908) and September 25 (1916); while during six years harvest began between September 2 and 8.

DATES OF FARM OPERATIONS FOR 1921

First work on land (discing)	April 21.
Seeding wheat.	April 22.
Seeding oats.	April 23.
Seeding barley.	May 17.
Seeding spring rye.	May 28.
Seeding peas.	May 16.
Seeding corn.	May 27.
Seeding sunflowers.	May 10.
Seeding alfalfa.	May 24.
Seeding grasses and clovers.	May 17.
Seeding mangels.	June 2.
Spring ploughing.	April 20.
Summerfallow ploughing.	June 22.
Cultivating summerfallow.	June 27.
Cutting alfalfa, first crop.	July 5.
Cutting other hay crops.	July 18.
Cutting alfalfa, second crop.	August 16.
Ploughing sod.	August 5.
Cutting oats.	August 15.
Cutting barley.	August 22.
Cutting wheat.	August 17.
Cutting spring rye.	August 30.
Cutting peas.	September 7.
Cutting green feed.	August 30.
Threshing.	September 20-26.
Cutting corn.	August 27-29.
Cutting sunflowers.	September 9-13.
Silo filling, green feed.	August 1-2.
corn.	August 28-29.
sunflowers.	September 10-13.
Fall ploughing.	September 30-November 10.
Freeze-up.	November 13.

Potato planting has varied from May 17 to 25, while digging in the fall began between September 8 and October 7. With the exception of two years, potato harvest began between September 8 and 23.

Spring rye has been seeded each year at the same time as Marquis wheat, and has always matured from one to nine days later than that variety.

Corn has always been seeded between May 19 and 28.

ANIMAL HUSBANDRY

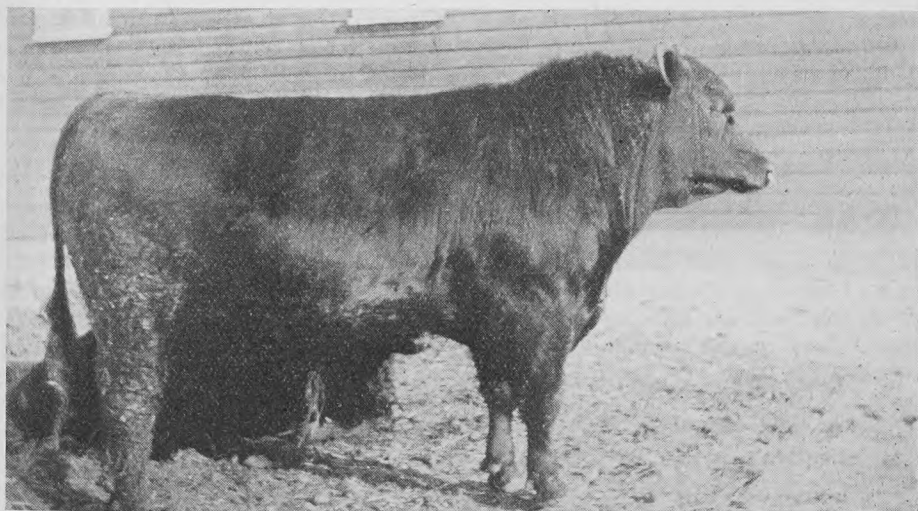
HORSES

Projects 6 to 8.—The horses at the Lacombe Experimental Station now number fifteen. Of these, four are pure-bred Clydesdale brood mares, one a pure-bred Clydesdale filly, four are grade Clydesdale mares, two are aged Clydesdale geldings, one a cross-bred gelding colt, and three are pure-bred Hackneys, one gelding and two mares. During the past year, the standard of the horses at this Station has been greatly improved. In the fall of 1921, seven aged work horses were fitted and sold at auction in Calgary. Two four-year-old Clydesdale brood mares were bought: Jean of Kilallan, No. 40898, sired by Cumberland Seal, and Bankview Dandelion, No. 40665, sired by Scotland's Splendour. These are both splendid mares, and should leave some good foals.

Both the two new mares and another pure-bred Clydesdale mare, Lily McTaggart (14972), foaled in the spring of 1921, but owing to extremely bad fortune, all the foals were lost. One never suckled, one died from joint-ill, and the third was struck by lightning. Two mares are bred to foal in 1922, Lily McTaggart and L. E. S. Lady Jane. As all the horses are working every day, experimental work has been out of the question.

BEEF CATTLE

The Aberdeen-Angus herd consists of seventy-two head, of which sixty are pure-bred and twelve are grade Angus. Of these there are three bulls, thirty-two breeding cows and heifers, sixteen yearling and two year-old heifers, fifteen calves (eight bull and seven heifer calves), and six steers, five of which are still calves.



L.E.S. Eliminator, 27633. First prize yearling at Kamloops Bull Sale, 1922.
Sold for \$250. Weight at eighteen months, 1,315 pounds.

The present herd sire, Eliminator of Gwenmawr 3rd, is an outstanding individual with respect to breed character, type, conformation and quality. He is a very pre-potent sire in that his calves invariably have exceptionally good heads, an abundance of quality and that early maturing quality which makes the Aberdeen-Angus the leading beef breed for early maturing steers and pre-eminent for baby beeves. He is a very choicely bred Ballindalloch Blackbird, sired by Edward of Glencarnock, in turn the sire of more prize-winning stock than any other Canadian Aberdeen-Angus bull.

In the herd there are not a great number of show winners, but there are a number of outstanding animals both as individuals and from a breeding standpoint as well. Some of the herd families are Mayflowers, Princess Kates, Rosebuds, Millicents, Flower Queens, Prides of Aberdeen, and a number of well-bred Blackbirds.

At the end of the year, it was found necessary to purchase a junior herd sire to breed to the daughters of Eliminator of Gwenmawr 3rd. It was decided that a bull with a little more size, scale and bone would follow best after the present herd sire. With this in view, Glencarnock Prideman 3rd, a growthy, smooth, straight-lined bull, was bought in March, 1922. At eighteen months of age, this bull weighed 1,300 pounds. While he has not the breediness and character of Eliminator of Gwenmawr 3rd, he has size and strength of bone with sufficient individuality, and has the breeding behind him which should make him the right bull as a junior herd sire.

Glencarnock Prideman 3rd is a well-bred Pride of Aberdeen, sired by Blackcap MacGregor, the greatest show bull of his day. Glencarnock Prideman 3rd is a grandson of Edward of Glencarnock; thus, a practice of line breeding is being followed at this Station which is not inbreeding too closely, and should concentrate in the herd some of the very best Aberdeen-Angus blood.

EXPERIMENTAL WORK WITH BEEF CATTLE

Because of limited stable and corral room, very little experimental work has been possible with the beef cattle. A number of temporary box stalls had to be put up in the passage ways to make stable quarters for the calves, as many as three cows with calves were run in one box stall, and a number of cows were tied up in the stable passage ways.

However, accurate records are being kept of the feed fed to all classes of stock, and at a later date will be published more fully. Particular attention is being paid to costs of raising bulls and heifers, both fall and spring calved, also feed required to winter cows and heifers in the open, in corrals and in the stable. Commencing this year, a number of steers are being raised with the object of obtaining data on the cost of producing beef.

WINTERING CATTLE IN THE OPEN

The dry cows and heifers over two years of age were wintered in a poplar bluff, open to the south, and sheltered on three exposed sides. Water was available daily from a slough in which a waterhole was opened every morning. They were fed green feed entirely, and ate from 22 to 25 pounds per head every day, depending on the weather. In very cold weather they ate considerably more than on the warmer days. All these cattle have wintered in good condition; some of them kept fat, particularly those with calf. From time to time, cows were brought in to calve, and in every instance the calves and cows have done very well. There has not been a case of sickness among either the calves or cows. There are 20 calves, and they are a very promising group of youngsters.

WINTERING YEARLING HEIFERS

The yearling heifers were not wintered with the dry cows and two-year-old heifers in the poplar bluff. At one year of age, heifers should be getting their best growth, and to give them a better opportunity for this, they were run in a corral close to the stable and fed more liberally than is usually practised. Their daily ration consisted of: 9 pounds of equal parts upland hay and oat green feed, 2 pounds cut straw, 20 pounds of sunflower silage, 5 pounds grain (2½ pounds oats, 1½ pounds barley, 1 pound bran). This ration cost 13.6 cents per day. The heifers have come through the winter well on this ration, but have not grown as well as they should have. They

have had to sleep in the open without any shelter whatever in very cold weather, and this must have been responsible for the retarding of their growth. Some kind of shed or straw shelter is planned for next year.

THE WINTERING OF NURSING STOCK

Cows with calves were wintered in the cow stable, tied in stanchions for the most part. Cows about to freshen were brought into the stable a few days before calving, and run in loose box stalls until the calves were well started.

The nurse cow's daily ration consisted of: 10 pounds of equal parts hay and green feed, 40 pounds sunflower silage, 2 pounds cut straw mixed in the silage, 5 pounds grain (equal parts barley and oats). This ration cost 18.2 cents per day, making the monthly cost of feeding an Angus cow nursing a calf \$5.46. This cost, over and above feed in addition to its dam's milk, is charged up to each calf every month in estimating the cost of raising winter calves.

These cows have wintered in very good condition. Some of them have gained in flesh, and the majority of them have kept in fairly even fleshing all winter, though nursing a calf.

COST OF FITTING ANGUS BULLS FOR SALE

Project 88.—Method.—As the fitting of young bulls for sale is a very necessary practice on every pure-bred live stock farm, it was decided to carry on a test with three Angus bulls that were going to be fitted for spring sale in 1922. The object was to get data on the gains that could be expected, the feed required, the cost of fitting, and the time required to get a bull in good sale shape.

TABLE No. 1—BULLS IN CORRAL WITH OPEN SHED SHELTER

Number of bulls.. . . .	3
Weight when started, January 17.. . . .	Lbs. 3,200
Average weight.. . . .	" 1,066.6
Weight when taken to sale, March 24.. . . .	" 3,665.0
Average weight.. . . .	" 1,221.6
Total gain in 66 days.. . . .	" 465
Average gain in 66 days.. . . .	" 155
Average gain each per day.. . . .	" 2.34
Feed consumed—	
Meal—5 parts oats,	
5 parts barley,	
3 parts bran at 1½ cents per pound,	
1 part oilcake.. . . .	" 2,310
Alfalfa at \$21 per ton.. . . .	" 990
Silage at \$3 per ton.. . . .	" 2,250
Total cost for period.. . . .	\$42.60
Average cost per head.. . . .	14.53
Cost to make one pound of gain.. . . .	9.16

In the sixty-six days on test, these bulls made excellent gains. The feeding was high, but it should be kept in mind that these bulls were outside in very cold weather most of the time. All the shelter they had was a shed to run in at nights and to feed in. When the bulls came off test they were in excellent sale fit. Though they made gains of an average of 155 pounds each, they were in fair fit before put on this test. The time allowed was not sufficient to fit a bull that was in a thin condition. For a young, growing bull, upwards of three months with good feeding would be required to put him in really good sale shape.

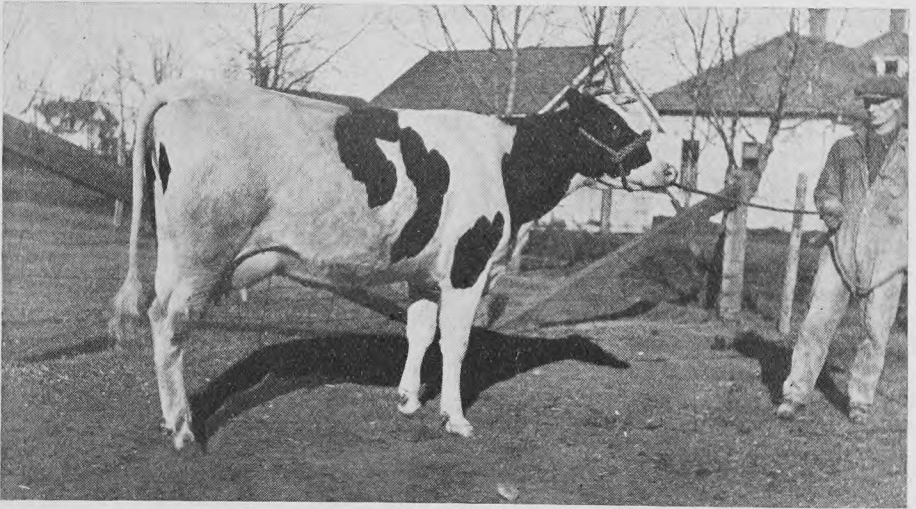
The cost per head for fitting alone was \$14.53, which might appear to be too high; but when these bulls were sold at auction they brought an average of \$195 each, as compared with \$160, an average made by a similar lot of improperly fitted bulls at the same sale. Good fitting for sale is of the greatest importance.

DAIRY CATTLE

The Holstein-Friesian herd at this Station now numbers sixty-one head, of which forty-one are pure-bred and twenty are grades. There are thirty milking cows and heifers, twelve yearling and two year-old heifers, seventeen calves, and three bulls. The previous herd sire, Prince Aaggie Mechthilde, No. 8482, was transferred to the Agassiz Farm in December. This old bull has proved himself to be one of the best sires of the breed. Already he has four proven sons and twenty-three daughters in the Record of Performance, and has a number of promising young bulls and heifers yet to be heard from.

The present herd sire is a young two-year-old bull, Ottawa Korndyke Keyes, No. 41184, an outstanding individual of the breed as to type, breediness and quality, and he has a breeding back of him which, with his quality and strength of top, makes him an exceptionally good bull to follow after Prince Aaggie Mechthilde. His sire, Pietje Keyes of Sunnysdale, No. 33130, is a grandson of that great bull, Inka Sylvia Beets Posch. His dam, Korndyke Canary Buttermaid, No. 49648, has a seven-day two-year-old record of 404.5 pounds milk and 19.285 pounds butter, and she is a line-bred grand-daughter of Pontiac Korndyke.

As a second herd sire, a son of Prince Aaggie Mechthilde is being used. His dam is Lawncrest Rosa Echo, No. 15021, a daughter of Inka Sylvia Beets Posch. She is one of the good old herd foundation cows with a yearly record, under unfavourable conditions, of 14,932 pounds milk and 502.5 pounds butter. L.E.S. Prince Echo Mechthilde, No. 41325, is a very large young bull with a great depth of middle, and with a great deal more quality than his sire. With the combination of size and quality carried by these two bulls, the Station is looking forward to some excellent breeding and record work with the Holsteins.



L.E.S. Johanna Alcartra, 75007, two-year-old Holstein-Friesian Heifer.
66.6 pounds of milk in one day.

During the year, three good young bulls were sold as herd sires. No heifers have been sold, as they are being kept until at least the yield of their first lactation period has been ascertained. Owing to the rapid increase in the herd, some will have to be disposed of before another winter. The complete disposal of the grade herd would relieve the congestion very considerably.

DAIRY HERD RECORDS

Project 1.—The following table is a compilation of the records of all cows and heifers finishing a lactation period during the fiscal year April 1, 1921, to March 31, 1922. This includes only those records which were finished during the fiscal year.

The feed charges include the dry period previous to freshening as well as for the total lactation period. In the case of heifers, the two months' feed, previous to calving, has been charged against the heifer.

In calculating the cost of feeds, the following values were used:—

Meal mixture.. . . .	1½ cents per pound
Ensilage and roots.. . . .	\$ 3.50 per ton
Hay.. . . .	17.00 " "
Alfalfa.. . . .	21.00 " "

These values represent the costs of growing where home-grown feeds are used and the actual price paid for bought feed delivered at the Station. Very few roots were used. About equal quantities of sunflower and oat ensilage were fed, and \$3.50 is the average cost of production for the two, valuing oat silage at \$4 a ton and sunflower silage at \$3 a ton.

Pasture has been omitted, as it was not relied upon to form any large part in the year's ration and as, at the outset, pasture would cost only \$1 a head per month, such a charge could not influence the cost for the herd very much.

At the end of the year, some of these prices seem high, and the value of milk and butter appears low. It must be borne in mind that an average price for both feed and milk has been taken for the past year. At the beginning of the fiscal year feeds were comparatively much higher than at the end of the year, and, generally speaking, the price received for milk and butter in Alberta has been relatively low for the whole year.

Cost of labour and care of cattle, etc., have not been accounted for. It is estimated that the manure would pay for the bedding, and the increase in stock, some of which were quite valuable, should offset the cost of labour and care of the cattle, as well as overhead charges, interest on investment and depreciation.

DAIRY HERD RECORDS

	Age when Fresh-ened	Date of Dropping Calf	No. of Days in Lacta- tion Period	Total Amount of Milk for Period	Daily Average Yield of Milk	Average % Fat in Milk	Lbs. of Butter Pro- duced in Milk Period	Value of Milk at \$1.60 a Hundred	Value of Butter at 35c. per lb.	Amount of Meal eaten at 14c. per lb.	Amount of Ensi- lage and Roots at \$3.50 per ton	Amount of Hay eaten at \$17.00 per ton	Amount of Alfalfa eaten at \$21.00 per ton	Cost of Total Cost of Feed	Cost to Produce 100 lbs. Milk	Profit had Milk been sold as Butter at 35c. per lb.	Profit on Milk sold at \$1.60 per Hundred	
PUREBREDS	Lawncrest Rosa Echo.....	11 Feb. 13, 1921	372	7,807.7	20.9	2.9	283.0	\$ cts. 124 91	\$ cts 99 05	4,040	12,600	1,400	1,600	\$ cts. 91 35	\$ cts. 1 17	\$ cts 7 70	\$ cts 53 56	
	Nina Gem Lutske.....	12 Jan. 4, 1921	321	8,734.5	27.2	3.2	349.3	139 75	122 25	2,605	10,815	1,375	1,580	86 34	0 98	35 91	53 41	
	L.E.S. Korndyke Rosa.....	6 Sept. 22, 1920	420	8,119.8	19.3	2.9	294.2	129 91	102 98	3,730	11,940	1,460	1,685	106 94	1 31	-3 96	22 97	
	L.E.S. Nina Gem Lutske....	6 May 25, 1920	463	11,399.5	24.6	3.2	455.9	182 39	159 56	4,625	13,030	1,535	1,775	108 28	0 95	51 28	74 11	
	L.E.S. Daisy Johanna.....	6 Mar. 21, 1921	344	14,144.4	41.1	3.3	583.4	226.31	204 19	5,310	8,840	2,300	2,715	143 17	1 01	61 02	83 14	
	L.E.S. Korndyke Rosa Echo	5 Nov. 6, 1920	365	19,244.2	52.7	3.3	810.9	307 90	283 81	6,170	10,920	2,265	2,690	159 15	0 82	124 66	148 75	
	L.E.S. Royallon Korndyke Star.....	5 Mar. 22, 1920	544	12,632 5	23.2	3.0	473.7	202 12	165 79	3,765	162.15	2,120	2,345	127 52	1 01	38 27	75 60	
	L.E.S. Evergreen Rosa.....	2 Dec. 28, 1919	390	10,238.0	25.8	3.3	422.3	163 80	147 80	3,455	13,390	2,065	2,280	116 72	1 14	31 08	47 08	
	L.E.S. Evergreen Johanna...	3 Jan. 4, 1921	365	15,530.2	42.5	3.2	623.7	248 48	218 29	5,300	8,075	2,170	2,315	136 25	0 87	82 04	112 23	
	L.E.S. May Echo Lee.....	3 Mar. 7, 1921	365	16,787.0	45.9	3.0	612.3	268 59	214 30	5,895	9,110	2,200	2,425	148 52	0 88	65 78	120 07	
Total for Purebreds.....		59	3,954	124,637.8	323.2	31.3	4,908.7	1,994 16	1,718 02	44,895.0	114,435	18,890	21,410	1,224 24	10 14	493 78	700 92	
Averages for Purebreds...		5.9	395	12,463.7	32.3	3.13	490.8	199 41	171 80	4,489.5	11,493.5	1,859	2,141	122 42	1 01	49 37	79 09	
GRADE HOUSEAINS	Grade No. 41.....	6 July 6, 1920	329	9,019.8	25.1	3.8	428.4	144 31	149 94	2,960	10,810	1,545	1,710	94 36	1 04	55 58	49 95	
	Grade No. 134.....	4 Nov. 19, 1921	372	14,965.5	40.2	3.3	617 3	239 44	216 05	13,497	3,225	12,085	1,690	104 47	69	111 58	134 97	
	Grade No. 126.....	3 June 14, 1920	237	6,974.6	24.4	3.6	313.8	111 59	109 83	2,170	9,565	1,380	1,575	75 55	1 08	34 28	36 04	
	Grade No. 128.....	3 May 5, 1920	308	7,387.1	23.9	3.2	295.4	118 19	103 39	2,425	10,770	1,435	1,690	85 14	1 16	18 25	33 05	
	Grade No. 79.....	3 Nov. 6, 1920	412	8,076.3	19.6	4.2	424.0	129 22	133 40	3,050	13,500	1,400	1,615	98 23	1 21	35 17	30 99	
	Grade No. 124.....	2 Nov. 15, 1920	380	13,237.5	34.5	3.7	612.2	211 80	214 27	3,200	10,550	1,490	1,685	96 81	0 73	117 46	114 99	
	Grade No. 121.....	2 Nov. 20, 1920	308	8,496.8	27.6	3.6	382.3	135 94	133 80	2,575	9,860	1,370	1,565	83 94	0 97	49 86	52 00	
	Totals for Grades.....		23	2,346	68,157.6	200.6	25.4	3,073.4	1,090 49	1,060 68	19,615	77,150	10,310	11,785	638 50	6 88	422 18	451 99
	Averages for Grades....		3.3	335	9,736.8	28.6	3.6	439.0	155 78	151 62	2,802	11,021	1,473	1,683	91 21	0 98	60 31	64 57
	Totals for Herd.....		82	6,300	192,795.4	523.8	56.7	7,982.1	3,084 65	2,778 70	64,510	192,075	29,200	33,195	1,862 74	17 02	915 96	1,242 91
Averages for Herd.....		4.8	370	11,340.9	30.7	3.33	469.5	181 45	163 45	3,794	11,299	1,717	1,953	109.57	1.001	53 88	73 11	

RECORD OF PERFORMANCE AND FEEDING FOR HEAVY MILK YIELDS

Project 89.—In addition to the lactation and feed records kept at this Station, a number of the dairy cows are entered in the Record of Performance for Pure-bred Dairy Cattle conducted by the Dominion Live Stock Branch. Up to the present time, fifteen cows and heifers have been entered and four very creditable records are now completed. It is planned to continue this work with all possible cows and heifers, particularly the heifers.

HOLSTEIN-FRIESIAN CANADIAN RECORD OF PERFORMANCE TESTS AT LACOMBE
EXPERIMENTAL STATION APRIL 1, 1921, TO MARCH 31, 1922

Name and Number of Cow	Age at Commencement of Test		No. of Days Milking	Lbs. of Milk Produced	Average % Fat	Lbs. of Fat Produced	Lbs. 80% Butter
	Years	Days					
L.E.S. Korndyke Rosa Echo 35780	5	204	365	19,244	3.23	621	776
L.E.S. Evergreen Johanna.... 56199	3	187	365	15,530	3.17	492	615
L.E.S. May Echo Lee..... 56206	3	302	365	16,787	3.0	489	612
L.E.S. Daisy Johanna..... 31601	6	143	365	14,568	3.3	479	599

The conditions under which these records were made are only fair. No box stall space was available, and as a result these cows were tied up in stanchions which were too crowded and so short as to be uncomfortable. The mangers are so wide that the cows had to get down on their knees to clean up their feed.

The meal ration fed these cows consisted of a mixture of 240 pounds oatchop, 120 pounds bran, and 100 pounds oilcake meal. This was fed in quantities up to 25 pounds per day, in one or two instances as high as 30 pounds per day.

In the winter, the roughage consisted of alfalfa hay, oat silage, and, early in the fall, some swede turnips. Occasionally some upland hay of good quality was fed to add a little variety to the ration. In the summer, the cows had whatever pasture was available, sometimes as far away as a mile from the stable. In addition, they had all of the above grain mixture that they would clean up. Hay or alfalfa was also fed, the cattle preferring some coarse hay to add bulk to the otherwise heavy concentrated ration.

All cows on test were milked three times a day, at five in the morning, one in the afternoon, and at eight o'clock at night. In winter, immediately after milking in the morning, they were fed meal on some silage. At eight o'clock they were fed alfalfa. During milking time at one o'clock they received more meal on silage, followed by alfalfa, and at night they were fed the same at the eight o'clock milking. Salt was fed in the meal ration, and fresh water was available in bowls at all times. The cows were well groomed daily, and the stable cleaned every morning and afternoon. During the cold winter months the cows were confined to the stable and did not get out for exercise.

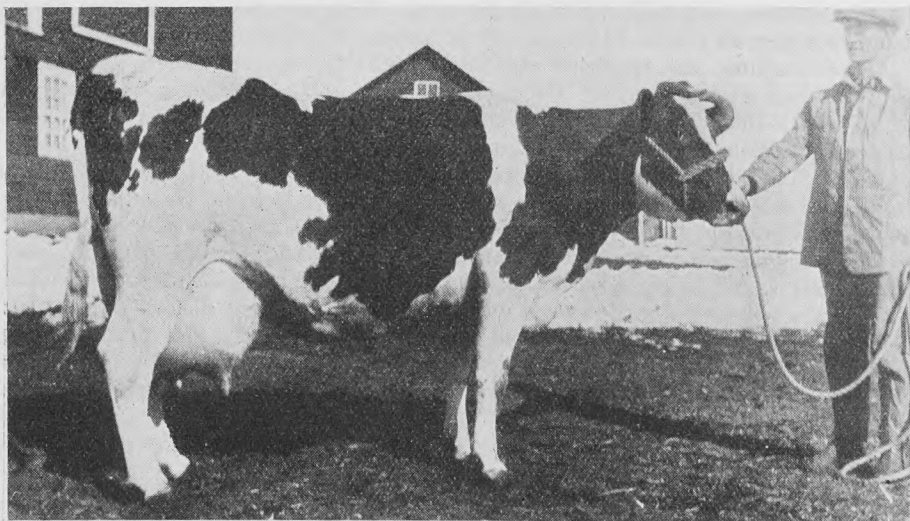
WHOLE VS. GROUND OATS FOR CALVES

Project 90.—Method.—An experiment was carried out to try the merits of whole and ground oats as a grain feed for growing calves. Two lots of heifer calves, two in each lot, were fed ground oats, and two lots were fed whole oats. There were two lots of calves six months old and two lots ten months old, one group of each age getting whole oats and the other group ground oats.

TABLE NO. 3—WHOLE *vs.* GROUND OATS FOR CALVES

	Heifers 6 Months Old		Heifers 10 Months Old	
	Ground Oats 1	Whole Oats 2	Whole Oats 3	Ground Oats 4
Number of calves on test.....	2	2	2	2
Number of days on test.....	60	60	60	60
Weight at commencement.....Lbs.	455	550	1,275	1,160
Weight at end of first 30 days.....	588	684	1,346	1,272
Gain at end of first 30 days.....	133	134	71	112
Average daily gain per heifer.....	2.21	2.23	1.18	1.86
Weight at end of 60 days.....	715	814	1,456	1,384
Gain for the second 30 days.....	127	130	110	112
Average daily gain per heifer for second 30 days.....	2.11	2.16	1.83	1.86
Total gain for 60 days.....	260	264	181	224
Average daily gain per heifer for 60 days.....	2.16	2.2	1.50	1.86
Feed consumed—				
Oats at \$1 per hundred.....Lbs.	330	330	600	600
Alfalfa at \$21 per ton.....	350	350	480	480
Skimmilk at 20c. per hundred.....	1,800	1,800		
Sunflower silage at \$3 per ton.....	1,440	1,440	1,800	1,800
Total cost of feed.....\$	12.73	12.73	13.74	13.74
Cost per heifer per month.....\$	3.18	3.18	3.43	3.43
Cost per pound of gain.....\$	4.89	4.82	7.59	6.13

The results of this experiment are somewhat conflicting. With the six-months-old calves, whole oats have given better results by a very slight margin over ground oats, for both months. On the other hand, with the ten-months-old calves, ground oats have given better gains. During the last month of the test, the gains were practically the same. Therefore, during the first month, either the ten-months-old calves did not take kindly to the whole oats or, what is more probable, some other unknown outside influence may have caused the difference between 71 pounds gain for whole oats as compared with 112 for ground oats.



Lawncrest Rosa Echo, No. 15021, one of the herd foundation cows with four generations of daughters in the herd.

It would seem that whole oats are just as good as ground oats for calves at six months of age. At that age, the cost of grinding might just as well be eliminated. With grinding at \$2 a ton, the saving would be worth while on a winter's feed for calves.

SUNFLOWER ENSILAGE

SUNFLOWER SILAGE VS. OAT SILAGE FOR MILK PRODUCTION WITH HIGH-PRODUCING COWS

Project 4.—An experiment comparing sunflower and oat silage for milk production was carried out in November, 1921, with seven cows on test for Record of Performance. This is the first of a number of experiments that will be carried on to determine the value of sunflowers in the production of milk. While the results are not conclusive, they are very decidedly in favour of the oat silage for high-producing cows.

On November 1, seven R.O.P. cows were started on sunflower silage. For several weeks previous these cows had been fed oat silage, averaging 25 pounds daily. The change to sunflower silage was made gradually, taking a week to bring the cows to the full ration of 35 pounds per day. It was found that the cows in every instance took to the new silage very readily, seemed to prefer it to the oat silage, and would eat much larger quantities of it (not a greater bulk but a greater weight). From the eighth to the sixteenth of the month, they were fed a full ration of sunflowers. From the beginning of the test, the cows dropped in milk flow. The decrease was very regular but decided. The last few days' milk averaged about 40 pounds daily lower than the daily average at the beginning of the month.

On the sixteenth of the month the cows were switched back to oat silage. The decrease had been so noticeable that it was thought advisable to change off the sunflowers at once to save the records. From the day that the change to oat silage was made the cows began to regain their milk flow, and in the course of a week they were back to where they had started at the beginning of the month.

Conditions other than the change in feed did not appear to have been influencing the milk flow. From the beginning of the month to the eighteenth there was no cold weather; it was remarkably uniform. However, on the eighteenth a severe cold spell set in, the thermometer dropping as low as 25.4 degrees below zero and the weather remaining cold for nine days. It was during this cold snap that the cows regained their milk flow after having been put back on oat silage.

Throughout this experiment the cows were at all times allowed the same ration of hay and meal. It would, therefore, seem that sunflower silage is not nearly as good as oat silage for high producing cows; in fact, that the maximum flow of milk cannot be maintained when feeding a full allowance of sunflower silage in the ration.

Cows used in this Experiment

L.E.S. Evergreen Gretchen 75005.

L.E.S. Daisy Johanna 31601.

L.E.S. Evergreen Johanna 56199.

May Echo Lady 39918.

L.E.S. May Echo Meechthilde 70080.

L.E.S. Evergreen Rosa 56204.

L.E.S. May Echo Lee 56206.

DAILY TEMPERATURE RECORDS AND YIELDS

Date		Maximum Temperature	Minimum Temperature	Day's Milk
		Degrees F.	Degrees F.	lbs.
Nov.	1.....	51.8	18.4	277.3
	2.....	53.8	31.0	285.0
	3.....	62.3	18.9	274.2
	4.....	43.8	27.3	278.7
	5.....	56.8	21.9	274.3
	6.....	43.8	21.9	271.4
	7.....	34.8	9.9	267.2
	8.....	28.8	- 3.6	264.7
	9.....	40.6	12.7	265.7
	10.....	48.3	35.4	264.9
	11.....	54.3	23.9	264.0
	12.....	59.8	28.9	251.2
	13.....	39.8	24.9	242.2
	14.....	35.8	12.9	242.8
	15.....	32.8	14.9	239.6
	16.....	25.1	4.4	237.2

CHANGED BACK TO OAT SILAGE NOVEMBER 16

17.....	20.8	1.9	249.9
18.....	3.3	-12.6	249.5
19.....	0.3	-25.6	262.4
20.....	8.8	-12.1	267.0
21.....	- 2.2	-18.1	270.0
22.....	- 2.2	-23.1	269.0
23.....	3.8	-23.1	277.0
24.....	3.8	-18.6	270.4
25.....	6.0	-11.1	271.1
26.....	11.8	-14.1	278.4
27.....	44.8	9.9	279.5
28.....	35.5	14.4	279.3
29.....	35.3	11.9	281.0
30.....	33.3	15.9	273.2

WINTERING CATTLE IN THE OPEN

On the sixteenth they were switched to oat silage, and a gradual yet rapid increase is seen in the milk flow. In eight days they were back to normal, and the average for the last three days of the month is 278.1 pounds, which is within 0.7 of a pound of that of the first three days of the month.

SUNFLOWERS VS. OAT SILAGE FOR MILK PRODUCTION WITH AVERAGE PRODUCING COWS

During the past few years the most debated topic for the western dairy farmer has been sunflower ensilage. Many have been the arguments for and against, some of them quite extreme.

The object of this experiment was to determine the value of sunflower ensilage for the average dairy herd.

Plan.—The cows used in this experiment were both pure-bred and grade cows, nearly all with several months of their lactation period gone, and some well on in their lactation period. The experiment was conducted in periods of four weeks each, the last week only being used for comparison. To prevent any miscalculation which the normal decline in milk flow might otherwise cause, the experiment was run in three periods; the average of the first and third being compared with the second. The grain ration for each individual cow was kept constantly the same, as nearly as was possible, throughout the experiment, and they were all fed all the ensilage they would clean up. The total amount of each feed eaten is given in the table.

Samples of ensilage were taken for analysis, and were found to be made up as follows:—

	Water	Crude Protein	Crude Fat	Carbo-hydrates	Fibre	Fat	Nutritive Ratio
Oat silage.....	68.75	3.18	0.87	14.09	10.74	2.37	1.504
Sunflower silage.....	77.84	2.64	0.34	10.63	5.53	3.01	1.432

The value placed upon the various feeds was as follows: Oats, \$1 a hundred; oil-cake, \$50 a ton; bran, \$14 a ton; hay, \$14 a ton; sunflower silage, \$3 a ton; oat silage, \$4 a ton.

TABLE No. 5—SUNFLOWER vs. OAT SILAGE

	1 Oat Silage	3 Oat Silage	Average of 1 and 3	2 Sunflower Silage
FEED CONSUMED				
Oats at 34c. per bushel..... Lbs.	320	280	300	275
Bran at \$14 per ton..... "	266	266	266	266
Oilcake at \$50 per ton..... "	98	98	98	98
Hay at \$14 per ton..... "	490	490	490	441
Silage {Sunflower at \$3 per ton}..... "	1,100	1,568	1,334	1,792
{Oat at \$4 per ton.....}				
No. of cows on test.....	7	7	7	7
Total milk for period..... Lbs.	1,212.1	1,096.1	1,154.1	1,181.5
Average milk per cow per day.....	24.7	22.3	23.5	24.1
Average % fat..... %	3.5	3.64	3.57	3.6
Total fat by 7 cows..... Lbs.	42.4	38.99	41.20	42.53
Total pounds butter..... "	53	48.7	51.5	53.1
Cost of feed for 7 days for 7 cows..... \$	13.14	13.67	13.41	12.82
Cost to produce 100 lbs. milk..... \$	1.08	1.24	1.16	1.08
Cost to produce 1 lb. fat..... c.	30.9	35.0	32.5	30.1
Cost to produce 1 lb. butter..... c.	24.7	28.0	26.3	24.1
Profit on 100 lbs. milk at \$1.60 a hundred..... c.	52	36	44	52
WEIGHTS OF COWS				
Average weight commencing the period..... Lbs.	1,227	1,244	1,235	1,239
Average weight at end of period..... "	1,216	1,299	1,257	1,261
Average gain or loss..... "	-11	55	17	21

What difference there is between the two silages is slightly in favour of the sunflowers. This, however, is so trifling as to be only indicative. It is seen that practically the same grain was consumed in all cases, but more sunflower ensilage was eaten and a slightly lesser amount of hay eaten when the sunflower ensilage was fed. As sunflowers are less bulky for the given weight, it is only natural that the cows should eat a greater weight of it.

When fed sunflowers, the cost for 100 pounds of milk was reduced 8 cents; the cost for the feed required to make one pound of butter was reduced 2.2 cents, and the cost for one pound of fat 2.4 cents. A greater difference is seen in the profit on 100 pounds milk, the profit when fed sunflower silage being 52 cents on 100 pounds as compared with 44 cents when fed oat silage.

There was little difference in the gains in weight, only an average of 4 pounds in favour of the sunflower-fed cows. This is of very little importance, as some of the cows were getting heavy in calf before the end of the experiment. For the average milking herd, it would appear that sunflower silage is the equal of oat silage.

DAIRY MANUFACTURING

Owing to the difficulty of securing a sufficiently large supply of milk, particularly in winter, there are, as yet, only three cheese factories in operation in Alberta. There is, however, a good local market for cheese at prices relatively higher than prices for butter, and with the rapidly increasing numbers of cows in the province, there is a demand from farmers for cheese factories. The greater part of the cheese manufactured at the Station has been sold locally or to nearby towns.

The following table gives a comparison between cheesemaking and buttermaking, and the returns are decidedly in favour of cheese:—

DAIRY REPORT, DOMINION EXPERIMENTAL STATION, LACOMBE, FOR 1921-22

Month	Amount milk for cheese	Cheese made	Milk for one pound cheese	Price of cheese per pound	Value of milk per cwt.	Per cent of fat in milk	Number of pounds butterfat	Price of butterfat per pound	Value of milk per cwt.	Profit per cwt. of milk for cheese over butter	Average profit for year per cwt. of milk for cheese over butter
	Lbs.	Lbs.	Lbs.	cts.	\$ cts.	p.c.	Lbs.	cts.	\$ cts.	\$ cts.	\$ cts.
April.....	8,968	828½	10·8	30	2 77	3·0	269·04	47	1 44	1 33	
May.....	11,045	1,011½	10·9	29	2 65	3·2	353·44	32	1 02	1 63	
June.....	10,472	972½	10·7	20	1 85	3·1	324·63	28	0 87	0 98	
July.....	11,127	1,031½	10·7	20	1 86	3·0	333·81	31	0 93	0 93	
August.....	10,569	1,000	10·5	24	2 27	3·2	338·20	33	1 05	1 22	
September.....	8,256	776	10·6	25	2 35	3·4	280·70	34	1 15	1 20	
October.....	8,134	762½	10·6	25	2 34	3·6	292·82	30	1 08	1 26	
November.....	7,107	677½	10·5	22	2 09	3·4	241·63	35	1 19	0 90	
December.....	10,996	1,075½	10·2	22	2 15	3·4	372·86	36	1 22	0 93	
January.....	8,727	828	10·5	20	1 89	3·6	314·17	31	1 11	0 78	
February.....	7,778	746	10·4	20	1 92	3·5	272·23	28	0 99	0 93	
March.....	12,724	1,246	10·2	17½	1 71	3·6	458·06	30	1 08	0 63	1 06
Total.....	115,903										

On this amount of milk cheesemaking showed a profit of \$1,230·54 over buttermaking.

SHEEP

The flock of sheep now numbers 581 head. There are 13 rams, 362 breeding ewes, and 206 lambs from the 1921 lamb crop. The sheep work at this Station has been largely a grading-up experiment. In 1917, a number of range ewes were bought, and six different breeds of pure-bred rams were bred to these ewes. The breeds of rams used were Leicester, Hampshire, Oxford, Corriedale, Cheviot and Shropshire. At present there are no original range ewes, and the entire breeding stock is composed of graded ewes of the above six breeds, and includes both first and second crosses. Already the sheep have taken on the breed characters so strongly that the different breeds can at once be distinguished. The Cheviots are particularly outstanding in this respect. Their erect ears, white faces and square-shaped bodies are very characteristically Cheviot.

There are 67 Leicester, 45 Cheviot, 34 Corriedale, 51 Hampshire, 48 Oxford and 115 Shropshire breeding ewes. Of these, 92 are yearling ewes, both first and second crosses. The ewes are bred to lamb commencing April 12.



Sheep going to pasture through the lane at the Experimental Station, Lacombe.

During the past year all the original ewes were disposed of, leaving the entire flock, exclusive of rams, grades of the six breeds. All the sheep were wintered in corrals in the open without shelter of any kind, and they have wintered in excellent condition. It was possible to obtain some very good upland hay which made the best of sheep feed. In addition to hay, the sheep received green feed to the extent of about one-third of the ration. Oats were fed during the breeding season to flush the ewes, and will be fed again during lambing season, starting about a week previous to lambing. The 1921 lambs were fed half a pound a day of whole oats when just off the range in the fall and during very cold weather in the winter. It is found that green feed fed with hay makes a better ration than hay alone or green feed alone. The green feed gives a little more variety, which is essential in good sheep feeding. For sheep, green feed should be as fine as possible and it should be cut fairly green. It is then much more tasty and palatable. Sheep waste far too much if the green feed is coarse and strawy.

The experimental work with the six breeds has not yet been carried on long enough to give any very definite results. Some things, however, are evident. The Leicester type is outstanding as compared with the other breeds. Also, the Leicester has kept its size better than the other breeds. The Leicester wethers outweighed all others when fitted for market. The Corriedales and Cheviots have shown themselves to be better range sheep than most of the others. However, the Corriedales do not take kindly to crowding in a corral. They do not push themselves in with the rest, and usually get the short end of a feed of oats or the choicest pieces of hay. The Hampshires have size, and do well in the feed lot, but are not as hardy as some of the other breeds. The Oxford is a good, useful sheep, and gives well-grown wethers. Under range conditions, the Shropshire has given the poorest results. Range sheep naturally are small, and in this respect the Shropshire falls down most of all the six breeds; nor is the Shropshire as hardy as it is necessary for range sheep to be. On the other hand, the Shropshire is an excellent farmer's sheep because of its ability to take care of itself under everyday farm conditions. The Shropshire, because of its domestic nature, does not require the constant attention that many of the other breeds do. Turned out to rustle for itself, a Shropshire will do well with very little care.

GRADING-UP EXPERIMENT

Project 9.—This experiment has not been carried on long enough to allow any very definite conclusions to be drawn. As the flock is carried under range conditions in summer, and in open corrals in winter, it is almost impossible to obtain any noticeable increase in size. Improvement must come largely through improvement as to type, and in the wool. The general type has been greatly raised, and the sheep are now a very even flock. This is more noticeable when each breed of grades is corralled separately. They then present a very uniform appearance.

The wool grading statement given herein is an accurate record of the percentage of each grade of wool obtained from the different breeds.

LEICESTER, OXFORD, SHROPSHIRE, HAMPSHIRE OR CHEVIOT FOR MUTTON

In the following table, the weights of the different breeds of wethers are found. In the off-range weights, the Hampshire, Corriedale and Cheviot lead. It would be expected that the Hampshire would weigh well because they are a heavy breed. On the other hand, it is surprising how well the Corriedale and Cheviot wethers weighed out, and particularly the Cheviot, which is the smallest of the six breeds. They are a very blocky, thick-set sheep, and extremely hardy. They do best on the open range. In the feed lot, the Leicester takes the lead, followed by the Hampshire and Oxford. These are larger breeds, and would be expected to put on gain more quickly in the feed lot. The Shropshire has given the least size, but for its size it has made exceptionally good gains in the feed lot of 20 pounds per head in sixty days, thereby holding its own with the heavier breeds. The Corriedale and Cheviot have given somewhat similar, and quite the lowest, gains in the feed lot.

BREED GIVING THE BEST LAMBS ON PASTURE

Project 91.—Referring to the same table, it is found that in 1921, as in 1920, the Hampshire lambs were the heaviest coming off summer range. In 1920 the Cheviots were the same weight as the Hampshires, but fell down in 1921, though in the two years' average they follow after the Hampshires. The Oxfords and Leicesters are very close for the two years' average. They are followed by the Corriedales, with the Shropshire lambs last by quite a margin, as they are one of the lighter breeds and do not do very well under range conditions.

COMPARISON OF BREEDS BY WEIGHT

Breed	Rams	Ewes			Wethers				Gains made by all wethers fattened in corrals	Lambs		
	Weights at beginning of breeding season	Weights coming off summer range		Average for all yearling first cross ewes	Average for all the wethers		Average for second cross wethers			Weights coming of summer range	All lambs were second cross lambs	
		Average for all ewes	Average for yearling first cross ewes		Average for yearling second cross ewes	Off range weights	Fattened weights	Off range weights				Fattened weights
Leicester.....	228	96.7	92.0	84.1	92.5	118.05	92.1	117.2	25.5	1921 62.0	1920 60.6	
Hampshire.....	242	102.6	88.2	85.5	95.2	116.6	93.7	114.6	21.4	65.0	66.2	
Oxford.....	200	93.9	75.5	85.0	93.1	114.1	94.3	113.9	21.0	62.8	60.5	
Corriedale.....	200	94.4	89.3	94.0	94.9	110.8	82.4	116.0	15.9	56.4	57.6	
Cheviot.....	150	96.8	85.0	79.4	94.2	109.7	94.9	113.5	15.5	59.2	66.2	
Shropshire.....	170	85.2	81.7	80.0	83.3	103.3	84.5	107.1	20.0	52.1	56.3	

TABLE No. 2—GRADING UP EXPERIMENT.—WOOL GRADING STATEMENT—1921 CLIP

Breed	Fine Medium Combing		Fine Medium Clothing		Medium Combing		Medium Clothing		Low Medium Combing		Low Medium Clothing		Low Combing	
	Lbs.	Fleeces	Lbs.	Fleeces	Lbs.	Fleeces	Lbs.	Fleeces	Lbs.	Fleeces	Lbs.	Fleeces	Lbs.	Fleeces
Shropshire Ewes.....	17	2	16	3	192	27	245	43	.....	.....	.....	.....	.....	.....
Wethers.....	39	5	48	8	81	11	97	15	19	3	.....	.....	.....	.....
Lambs.....	37	6	89	19	101	18	97	18	.....	.....	.....	.....	.....	.....
Totals.....	93	13	153	30	374	56	439	76	19	3	.....	.....	.....	.....
Per cent.....	7.5	.....	12.5	.....	30.5	.....	35.8	.....	1.5	.....	.....	.....	.....	.....
Hampshire Ewes.....	.....	.....	6	1	61	8	71	11	.....	.....	.....	.....	.....	.....
Wethers.....	11	2	28	6	27	4	34	6	7	1	.....	.....	.....	.....
Lambs.....	.....	.....	.....	.....	40	7	122	.....	.....	.....	.....	.....	.....	.....
Totals.....	11	2	34	7	128	19	227	17	7	1	.....	.....	.....	.....
Per cent.....	2.4	.....	7.5	.....	28.4	.....	50.3	.....	1.5	.....	.....	.....	.....	.....
Oxford Ewes.....	8	1	6	1	143	20	109	17	44	6	.....	.....	.....	.....
Wethers.....	.....	.....	11	2	72	9	42	7	16	2	.....	.....	.....	.....
Lambs.....	.....	.....	5	1	122	18	132	26	6	1	.....	.....	17	2
Totals.....	8	1	22	4	337	47	283	50	66	9	.....	.....	17	2
Per cent.....	1.1	.....	2.9	.....	45.4	.....	38.1	.....	8.9	.....	.....	.....	2.3	.....
Leicester Ewes.....	.....	.....	.....	.....	71	9	13	2	112	15	.....	.....	59	7
Wethers.....	11	1	5	1	83	10	.....	3	39	5	.....	.....	16	2
Lambs.....	.....	.....	.....	.....	18	3	13	.....	99	17	.....	.....	62	9
Totals.....	11	1	5	1	172	22	26	5	250	37	.....	.....	137	18
Per cent.....	1.7	.....	0.8	.....	26.1	.....	4.0	.....	37.9	.....	.....	.....	20.8	.....
Cheviot Ewes.....	.....	.....	.....	.....	114	16	45	7	56	7	.....	.....	18	2
Wethers.....	.....	.....	.....	.....	86	15	79	11	32	6	46	6	.....	.....
Lambs.....	.....	.....	14	3	.....	.....	66	14	.....	.....	.....	.....	.....	.....
Totals.....	.....	.....	14	3	200	31	190	32	88	13	46	6	18	2
Per cent.....	.....	.....	2.3	.....	33.1	.....	31.3	.....	14.5	.....	7.6	.....	3.0	.....
Corriedale Ewes.....	34	5	23	3	180	26	12	2	.....	.....	.....	.....	.....	.....
Wethers.....	80	9	47	6	53	9	15	2	8	1	9	1	.....	.....
Lambs.....	.....	.....	10	2	.....	.....	10	2	13	2	.....	.....	.....	.....
Totals.....	114	14	33	5	280	41	38	6	21	3	9	1	.....	.....
Per cent.....	20.3	.....	6.0	.....	49.9	.....	6.7	.....	3.7	.....	1.6	.....	.....	.....
Original Aged Ewes.....	135	19	267	42	137	20	206	31	81	10	.....	.....	13	2
Per cent.....	16.1	.....	31.9	.....	16.3	.....	24.6	.....	9.8	.....	.....	.....	1.5	.....
Arbitrary Value of Grades.....	14	.....	13	.....	12	.....	11	.....	10	.....	9	.....	8	.....

TABLE No. 2—GRADING UP EXPERIMENT—WOOL GRADING STATEMENT—1921 CLIP—Concluded

Breed	Low Clothing		Coarse		Mohair		Medium Grey and Black		Coarse Grey and Black		Fine Burry and Seedy		Medium Burry and Seedy	
	Lbs.	Fleeces	Lbs.	Fleeces	Lbs.	Fleeces	Lbs.	Fleeces	Lbs.	Fleeces	Lbs.	Fleeces	Lbs.	Fleeces
Shropshire Ewes.....													32	4
Wethers.....													17	7
Lambs.....													102	17
Totals.....													151	23
Per cent.....													12.3	
Hampshire Ewes.....													18	2
Wethers.....													26	5
Lambs.....													44	7
Totals.....													9.8	
Per cent.....													9	1
Oxford Ewes.....													9	1
Wethers.....													9	1
Lambs.....													9	1
Totals.....													1.2	
Per cent.....													10	1
Leicester Ewes.....			15	2			11	1					21	4
Wethers.....													31	5
Lambs.....			15	2			11	1					4.7	
Totals.....			2.3				1.7						22	3
Per cent.....													27	4
Cheviot Ewes.....													49	7
Wethers.....													7.7	
Lambs.....													60	7
Totals.....													60	7
Per cent.....													10.6	
Corriedale Ewes.....							8	1						
Wethers.....														
Lambs.....							8	1						
Totals.....							1.4							
Per cent.....														
Original Aged Ewes.....														
Per cent.....														
Arbitrary Value of Grades.....	7		6		5		4		3		2		1	

In order that the wool from the different breeds of crossbred sheep could be placed according to merit, an arbitrary value has been placed upon each grade of wool, starting at Fine Medium combing with a value of 14 and so on down to Medium Burry and Seedy with a value of 1. The percentage of wool clip in each grade is multiplied by its arbitrary value.

Using these values, the fleeces take the following order:—

Breed	Points scored
1. Original ewes..	1,216.3
2. Oxford grades..	1,125.6
3. Corriedale grades..	1,104.1
4. Shropshire grades..	1,054.6
5. Hampshire grades..	1,024.8
6. Cheviot grades..	1,016.5
7. Leicester grades..	962.1

TABLE No. 3.—GRADING UP EXPERIMENT.—LAMMING STATEMENT, 1921

Breed	Lambs from three-year-old ewes				Lambs from two-year-old ewes				Totals				Per cent of lambs to ewes		
	Ram lambs		Ewe lambs		Ram lambs		Ewe lambs		Ram lambs		Ewe lambs				
	No.	Average weight in pounds	No.	Average weight in pounds	No.	Average weight in pounds	No.	Average weight in pounds	No.	Average weight in pounds	No.	Average weight in pounds			
Hampshire.....	7	10.46	7	9.82	8	10.36	11	10.38	15	10.42	18	10.17	33	10.28	94.2
Oxford.....	7	8.68	3	7.58	15	10.08	14	9.05	22	9.64	17	8.8	39	9.27	102.6
Cheviot.....	13	8.66	9	8.69	4	10.37	6	7.79	17	9.06	15	8.33	32	8.72	88.8
Leicester.....	19	8.66	16	7.72	7	8.2	9	7.92	26	8.54	25	7.79	51	8.17	108.5
Shropshire.....	6	8.25	7	7.71	15	8.58	25	7.66	21	8.49	32	7.67	53	7.99	68.0
Corriedale.....	7	8.61	3	8.83	3	7.08	8	7.46	10	8.15	11	7.8	21	7.96	100.0

Of the 35 Hampshire ewes bred, 32 produced lambs in the spring, only 1 ewe producing twins. The heaviest lamb weighed 13 pounds when born and the lightest 8.25 pounds.

Of the 38 Oxford ewes bred, 37 produced lambs in the spring, 2 ewes producing twins. The heaviest lamb weighed 14.5 pounds when born and the lightest 5.5 pounds.

Of the 36 Cheviot ewes bred, 31 produced lambs in the spring, only 1 ewe producing twins. The heaviest lamb weighed 11.75 pounds when born and the lightest 6 pounds.

Of the 47 Leicester ewes bred, 46 produced lambs in the spring, 5 ewes producing twins. The heaviest lamb weighed 11 pounds when born and the lightest 5.25 pounds.

Of the 75 Shropshire ewes bred, 51 produced lambs in the spring, two producing twins and two producing dead lambs. The heaviest lamb weighed 10.75 pounds when born and the lightest 6 pounds.

Of the 21 Corriedale ewes bred, 20 produced lambs the following spring, only 1 ewe producing twins. The heaviest lamb weighed 10.75 pounds when born and the lightest 6.25 pounds.

The Shropshire rams used were 3 ram lambs which arrived from Ottawa only on November 25. This probably accounts for the small number of lambs produced.

Project 10.

TABLE No. 4—COST OF CARRYING SHEEP

Number of ewes.. . . .	390
Number of days fed—November 1 to May 15.. . . .	196
Total amount of hay fed.. . . .	Lbs. 259,896
Average hay fed, per head, per day.. . . .	" 3.4
Cost of hay at \$17 per ton.. . . .	\$2,109.11
Cost of hay, per head.. . . .	5.41
Total amount of oats fed (40 days at 1 pound per day).. . . .	" 15,600
Cost of oats at 43 cents per bushel.. . . .	\$197.29
Cost of oats per head.. . . .	.50
Total cost of feed per head.. . . .	5.91
Value of fleece per head, averaging 7.3 lbs. at 14c. per lb.. . . .	1.02
Net cost per head to winter in 1920-21.. . . .	4.89

This cost of \$4.89 per head includes only the feed costs, and is higher than it would be under everyday farm conditions because the sheep did no rustling at all during the winter. They were fed in corrals and all the feed had to be bought at top prices. These figures represent abnormal conditions when grain and hay prices were very high, and there was very little demand for wool.

SELLING SHORN VS. UNSHORN SHEEP

Project 11.—During the spring of 1920, 250 fat sheep were marketed. As there was a spread of 1 cent per pound between shorn and unshorn sheep, it was decided to shear the sheep, and estimate the price per pound the wool would have to sell for before it would pay to shear the sheep before selling.

One-cent per pound loss from selling as clipped sheep.. . . .	\$249.80
Cost of shearing sheep at 20 cents each.. . . .	50.00
Total cost of selling as shorn sheep.. . . .	\$299.50
Weight of wool.. . . .	2,087 lbs.
Price per pound wool would have to sell to make up loss of selling as shorn sheep.. . . .	\$299.80
	<hr/> =14.4c. per lb. 2087

COST OF RAISING WETHERS AND FITTING FOR MARKET

Project 92.—Method.—The following table gives the cost of raising 110 wethers sold in the winter of 1921-22. This includes the total cost of feed from the time they were lambled until marketed, but does not allow anything for the cost of keeping the ewes. It is generally conceded that the wool and the value of the ewe when finally sold for mutton would cover her keep during her term of usefulness. These wethers were lambled in the spring of 1920 and were on free range all summer.

COST OF WINTERING IN 1920-21

Number of lambs wintered.. . . .	258
Total number of days fed.. . . .Days	181
Total hay eaten.. . . .Tons	72.5
Cost of hay at \$17 per ton.. . . .	\$1,232.50
Total grain fed (oats).. . . .Bus.	400
Cost of 400 bushels oats at 43 cents per bushel.. . . .	\$ 172.00
Total cost to winter 258 lambs.. . . .	1,404.5
Cost per head.. . . .	5.44

Summer of 1921 on Free Range

Brought in off range and commenced to fatten.. . . .	Nov. 5
Cost to fatten, 1921-22:	
Feed required—	
1.47 pounds hay per head per day for 60 days at \$14 per ton.	\$.616
1.18 pounds oats per head per day for 60 days at 34 cents per bushel.. . . .	.708
.68 pounds green feed per head per day for 60 days at \$10 per ton.. . . .	.208
Total cost to feed per head to fatten.. . . .	1.53
Total cost of feed from lambing to marketing.. . . .	6.97
Returns from wethers—	
Value of fleece in spring of 1921, 5.77 pounds per head at 14 cents per pound.. . . .	\$ 0.80
Net returns per head when sold as wethers at \$7.75 per cwt.	8.33
Total returns per head.. . . .	9.13
Profit per head over cost of feed.. . . .	2.16
Profit on carload of 110 wethers.. . . .	237.60

COST OF MARKETING WETHERS IN CARLOAD LOTS

Project 93.—Method.—In January, 1922, a carload of 110 wethers was shipped to Edmonton, a distance of 80 miles. They were sold at \$7.75 per hundred off-car weights at Edmonton. In order to get data on the loss from shrinkage in shipping, the weight was taken over the scales at the Station and the findings are given in the following table:—

TABLE No. 6

Weight before shipping.. . . .	Lbs. 12,935
Number of wethers sold.. . . .	110
Selling price per 100 pounds.. . . .	\$ 7.75
Average weight per head.. . . .	" 117.59
Freight on carload.. . . .	29.65
Freight per pound weight at Lacombe.. . . .	.22
Weight off cars at Edmonton.. . . .	" 12,200
Average weight per head off cars.. . . .	" 110.9
Shrinkage per head.. . . .	" 6.69
Net returns (less one dead wether).. . . .	907.31
Net returns per head.. . . .	8.33
Net returns per pound.. . . .	7.01
Cost of marketing per pound.. . . .	.74
Had no wethers been killed en route net returns per pound would have been.. . . .	7.08
Had no wethers been killed en route net cost of marketing per pound would have been.. . . .	0.67
Division in costs of marketing—	
1. Freight per pound.. . . .	.22
2. Shrinkage per pound.. . . .	.45
Costs: 33 per cent freight,	
67 per cent shrinkage.	

THE SHRINKING OF WOOL IN STORAGE

Project 94.—The question of wool shrinkage between the point at which it is produced and the point at which it is marketed has been a subject on which there has been a considerable discussion among the sheep breeders of the district, and a subject on which there was very little, if any, actual information. As this Station markets a considerable quantity of wool each season, it has attempted to compile data that would throw some light on the subject.

Shearing started the second week in May, 127 aged ewes and 140 shearing wethers being shorn at that time. The wool was weighed on May 23. The breeding ewes and the lambs were shorn after this, and the wool weighed on June 11. The total weight of the wool clip at shearing time amounted to 5,507 pounds. This wool was sold through the local branch of the Canadian Co-operative Wool Growers, Limited, and weighed at the time of shipping, July 26, 5,486 pounds. The next check on the weight of the wool was as it passed over the wool grading table, when it weighed 5,448 pounds.

To obtain further information *re* the most suitable place to store wool and the possible gain or loss in weight when stored under various conditions, a number of sacks of wool were stored in all the different places around the farm where a variation in humidity might be expected.

The experiment was started on June 11 and completed on July 12. During that period there were 3.28 inches of rainfall and 368.2 hours of sunshine, with 245.9 hours of cloudy weather. The maximum temperature reached was 94.8 degrees and the minimum 29.8 degrees during that period.

SHRINKAGE OF WOOL IN STORAGE

	Weights before Storing	Weights after Storing
In stable with cattle.....	188	190
In root cellar.....	190	202
In hay loft.....	192	192
In granary.....	175	171
On ground in the open covered with canvas.....	170	179
On planks in the open covered with canvas.....	196	199

It is found that the wool stored in the hay loft neither gained nor lost in weight. This, apparently, is an ideal place for wool storage, while the granary and cow stable would follow next in suitability. It is doubtful if either the root cellar or the open air could be recommended as a storage place for wool. However, this wool was shipped with the balance of the clip, and no adverse comments were made at the grading station.

TABLE NO. 8.—SHEEP LOSSES FOR YEAR NOVEMBER 1, 1920 TO NOVEMBER 1, 1921

Date	Classification	Cause
Jan. 22, 1920.....	Leicester wether lamb.....	Kidney trouble.
Feb. 28, 1920.....	Shropshire wether lamb.....	Hurt at water trough.
June 30, 1920.....	Hampshire yearling wether.....	Picked up gopher poison.
June 28, 1920.....	Cheviot yearling ewe.....	Picked up gopher poison.
July 30, 1920.....	Leicester yearling wether.....	Died on range—Sick.
Aug. 6, 1920.....	Leicester yearling wether.....	Kidney trouble.
Aug. 18, 1920.....	Hampshire ewe, 3 years.....	Dysentery.
Sept. 20, 1920.....	Leicester ewe, 3 years.....	Pneumonia.
Sept. 5, 1920.....	Leicester wether lamb.....	Hurt at water spring.
Oct. 15, 1920.....	Hampshire yearling wether.....	Died on range—Sick.
Oct. 16, 1920.....	Hampshire ewe lamb.....	Died on range—Sick.

SWINE

During the winter of 1920-21, forty-four brood sows were kept over; 19 Berkshires, 12 Yorkshires, and 13 Duroc-Jerseys. In all 44 litters were farrowed during the year 1921, of which 6 were fall litters and 38 were spring litters. The results for the year are somewhat low, partly because of a change in swine herdsman just at farrowing time, the new man not being familiar with the sows, and partly because the accommodation for spring farrowing was unsatisfactory, but mainly because the litters were small and uneven. A number of late-fall litters were almost completely lost because there was no stove in the piggery. The greater part of the sows farrowed in small cabins fixed up as farrowing pens, and these did not prove satisfactory quarters. In all, 354 pigs were farrowed: 67 of these were dead at birth, 20 were hairless and died shortly after, 103 were lost from crushing, freezing or sickness, leaving a total of 164 pigs successfully raised; 23 pure-bred gilts and 27 pure-bred boars, a total of 50, were sold as breeding stock.

The breeding stock kept over the winter 1921-22 has been increased over previous years. In all, 60 sows and 7 boars were kept.

BREEDING STOCK KEPT OVER THE WINTER OF 1921-22

—	Old Sows over one year	Gilts	Boars	Total
Yorkshire.....	11	4	2	17
Berkshire.....	8	20	3	31
Duroc-Jersey.....	12	5	2	19
Total.....	31	29	7	67

It was found necessary to keep two boars of each breed to avoid inbreeding, and to enable all the sows brought in for service to be bred. Altogether, over sixty sows belonging to neighbouring farmers were bred.

In the summer of 1921 a young Yorkshire boar, Oak Lodge Prince 394 No. —73738—was bought from J. E. Brethour & Nephews, of Burford, Ont. This boar has developed into an outstandingly good breeder. Not only is he a good breeder, but he is an exceptionally good individual with great length, a strong top and plenty of bone.

Two Berkshire boars were bought, Sunny Brook Premier Dude, No. —58807—, and Tilley Major, No. —59760—. These boars were selected with the definite aim of improving the bacon qualities of the Berkshire hog. They were selected because of their length and depth of side and because of their strong bone. In breeding Berkshires the object in view is to get away from the short, thick, smooth, fine-boned type.

Experimental work was carried out under the following headings:—

1. Comparison of some popular Alberta-grown hog feeds.
 - (a) Whey, buttermilk, skim-milk or tankage for weaners.
 - (b) Shorts, barley or oats for weaners.
 - (c) Shorts and oatchop vs. shorts and barley vs. barley and oats.
2. Indoors vs. outside feeding for pork.
3. The value of tankage in the fattening ration.
4. Oats vs. barley for hogging down.
5. Yorkshire, Berkshire and Duroc-Jersey brood sows on summer pasture.
6. Hog cabin vs. piggery for fall litters.
7. Yorkshire vs. Duroc-Jersey vs. cross-bred Yorkshire and Duroc-Jersey from fall litters.
8. Cost of pork production with fall litters.

STRAW SHELTER FOR WINTERING BROOD SOWS

Project 95.—The essential points in winter quarters for brood sows are that they have a dry, sheltered and fairly warm place in which to sleep, that they are forced to take exercise and that they have access to mineral matter, which is perhaps best supplied by eating fresh earth or sods, of which they will consume large quantities. In the fall of 1921 a straw shelter was built in which to winter the 63 brood sows. In previous winters the sows were wintered in the small cabins, placed near the main piggery and covered with straw. This was not satisfactory, as the sows took very little exercise and many of them became too fat, with the result that the litters were small and several sows had no litters. In the very cold weather too many sows would crowd into the small cabins, and on one occasion four young sows were smothered.



Straw house for wintering brood sows.

This straw house is 48 feet by 18 feet, and is 4 feet at the eaves and 7 feet at the ridge pole. It was built almost entirely of waste material and straw, and is therefore a very cheap building in view of the fact that it is large enough to make sleeping quarters for 63 brood sows. The only new materials bought were 60 tamarack posts at 15 cents each and 15 pounds of wire staples. The remainder of the material was found on the Farm and consisted of 9 pairs of poplar rafters, 84 rods of discarded woven wire fencing and $10\frac{1}{2}$ loads of straw. In constructing this straw house two rows of posts 2 feet apart were put in for the sides and ends, woven wire was stretched on the inside of the posts, and then straw was tramped in. The rafters are supported by a ridge pole and plates, wire was stretched over the rafters and a couple of feet of straw was spread over this, then another covering of wire over the straw to keep it in place. The doors have a dropped canvas which largely prevents the wind from blowing in. With about a foot of straw bedding over the earth floor, there does not seem to be any tendency to crowd or pile up for warmth. The sows are comfortable but not too warm as is often the case in a straw stack.

The straw house was built two hundred yards from the main piggery near which the sows are fed, and they go back and forth twice a day over fall ploughed land. They are thus forced to take daily exercise, and in going back and forth they eat large quantities of fresh earth and sods. This method of housing a large number of sows is proving very satisfactory. There has been no illness among 63 sows and the early litters are coming large and strong; 10 sows have produced average litters

of 13 pigs. For wintering up to 5 or 6 sows a cheaper and warmer shelter could be made by building a low framework, covered with wire over which a pile of straw could be thrown at threshing time. A foot of bedding is plenty, and this will require changing only once or twice during a winter.

FEEDS FOR YOUNG PIGS AT WEANING TIME

Project 15.—Method.—A number of experiments were carried out in the summer of 1921 for the purpose of comparing the value of shorts, oats and barley when fed alone and in various combinations, such as equal parts shorts and oats, equal parts barley and oats, and equal parts shorts and barley. Seventy-five pigs, six to eight weeks old, were divided into fifteen lots, so as to have the lots as nearly uniform as possible in age, size and breed of the pigs. Each lot was given an eighth of an acre of oat or barley pasture, and the experiments were carried on for eight weeks in every instance. Each of the above meals were fed along with skim-milk, butter-milk, whey, tankage and water. Each lot had a small cabin for shelter and to sleep in at night, and a constant supply of fresh water. Different breeds of pigs were used, but each lot had an even distribution of Yorkshires, Berkshires and Duroc-Jerseys.

TABLE NO. 1—SHORTS, OATS AND BARLEY WHEN FED WITH WHEY

	Shorts	Oat-Chop	Barley
Number of pigs in lot.....	5	5	5
Number of days in test.....	56	56	56
Weight at beginning..... Lbs.	142	135	165
Final weight..... “	421	403	404
Total gain..... “	279	268	239
Average gain per hog..... “	55.8	53.6	47.8
Average daily gain per hog..... “	0.99	0.95	0.85
FEED CONSUMED			
Shorts at \$1.30 per 100 lbs..... Lbs.	490		
Barley at \$1.66 per 100 lbs..... “			498
Oats at \$1.12 per 100 lbs..... “		490	
Whey at 10c. per 100 lbs..... “	2,940	2,940	2,940
Meal required to produce 100 lbs. pork..... “	175	182	208
Cost to produce 100 lbs. gain..... \$	3 34	3 14	4 69

The results indicate that shorts have given greater gains than oats or barley, and is, therefore, a better single feed for growing young hogs on pasture. On the other hand, the oat-fed hogs made somewhat cheaper gains by 0.2 cents per pound.

TABLE NO. 2—SHORTS, OATS AND BARLEY WHEN FED WITH SKIM MILK

	Shorts	Oat-Chop	Barley
Number of pigs in lot.....	5	5	5
Number of days on test.....	56	56	56
Initial weight..... Lbs.	120	130	206
Final weight..... “	395	408	496
Total gain..... “	275	278	290
Average gain per hog..... “	55	55.6	58
Average daily gain per hog..... “	0.99	0.99	1.03
FEED CONSUMED			
Shorts at \$1.30 per 100 lbs..... Lbs.	463		
Barley at \$1.66 per 100 lbs..... “			498
Oats at \$1.12 per 100 lbs..... “		473	
Skim milk at 20c. per 100 lbs..... “	2,704	2,438	2,968
Meal required to produce 100 lbs. pork..... “	168	170	171
Cost to produce 100 lbs. gain..... \$	4 15	3 66	4 89

When fed with skim-milk, it is found that the greatest gains are made by the barley-fed hogs, with very little difference between the two lots fed shorts and oat-chop. Again, as in Table No. 1, the hogs fed on oat-chop made the cheapest gains.

TABLE NO. 3—SHORTS, OATS AND BARLEY WHEN FED WITH BUTTERMILK

	Shorts	Oat-Chop	Barley
Number of pigs in lot.....	5	5	5
Number of days on test.....	56	56	56
Initial weight.....Lbs.	128	124	140
Final weight.....	409	399	435
Total gains.....	281	275	295
Average gain per hog.....	56.2	55	59
Average daily gain per hog.....	1.00	0.99	1.05
FEED CONSUMED			
Shorts at \$1.30 per 100 lbs.....Lbs.	468		
Oats at \$1.12 per 100 lbs.....		468	
Barley at \$1.66 per 100 lbs.....			498
Buttermilk at 17c. per 100 lbs.....	2,808	2,808	2,968
Meal required to produce 100 lbs. pork.....	166	170	169
Cost to produce 100 lbs. gain.....\$	3 86	3 64	4 51

When fed with buttermilk, it is found in this experiment that barley has given slightly greater gains, but at a greater cost than either shorts or oat-chop. Here again, as in the two previous tables, oat-chop is found to give cheaper gains, but very little cheaper than the shorts.

TABLE NO. 4—SHORTS, OATS AND BARLEY WHEN FED WITH TANKAGE AND WATER

	Shorts	Oat-Chop	Barley
Number of pigs in lots.....	5	5	5
Number of days in test.....	56	56	56
Initial weight.....Lbs.	124	117	178
Final weight.....	348	333	374
Total gain.....	224	216	196
Average gain per hog.....	44.8	43.2	39.2
Average daily gain per hog.....	0.80	0.77	0.70
FEED CONSUMED			
Shorts at \$1.30 per 100 lbs.....Lbs.	490		
Oat-Chop at \$1.12 pr 100 lbs.....		490	
Barley at \$1.66 per 100 lbs.....			498
Tankage at \$2.37 per 100 lbs.....	43	43	43
Meal required to produce 100 lbs. pork.....	218	226	254
Cost to produce 100 lbs. gain.....\$	3 29	3 00	4 73

It is evident that all the hogs fed tankage did not gain nearly as rapidly as those fed whey, skim-milk or buttermilk, but of the three lots fed tankage, the shorts-fed hogs did considerably better than the barley-fed hogs, with the oat-fed hogs ranging in between. Though shorts gave greater gains than oats, the cost was a little higher.

TABLE No. 5—SHORTS, OATS AND BARLEY WHEN FED WITH WATER ONLY

	Shorts	Oat-Chop	Barley
Number of pigs in lots.....	5	5	5
Number of days on test.....	56	56	56
Initial weight.....Lbs.	133	119	126
Final weight.....	334	292	244
Total gain.....	201	173	118
Average gain per hog.....	40.2	34.6	23.6
Average daily gain per hog.....	0.71	0.61	0.42
FEED CONSUMED			
Shorts at \$1.30 per 100 lbs.....	513		
Oat-chop at \$1.12 per 100 lbs.....		513	
Barley at \$1.66 per 100 lbs.....			498
Meal required to produce 100 lbs. pork.....	255	296	422
Cost to produce 100 lbs. gain.....\$	3 31	3 32	7 60

When fed the meal ration with water only in addition the hogs consumed more meal and made even smaller gains than when fed tankage in the ration. Not only were the gains smaller, but the cost per pound of gain was greater. Of the three meals, shorts again takes the lead as a single meal fed with water. Oat-chop is not a close second excepting in the cost, and barley falls far short of either, and the cost per pound of gain is more than double that with the shorts and oat-fed hogs.

The following table is a summary of the five proceeding tables, giving a summary of the results obtained from the five experiments with shorts, oat-chop and barley. The results, therefore, will include the total gains and costs of the five lots fed shorts, oat-chop and barley with each of the following: whey, skim-milk, buttermilk, tankage and water.

TABLE No. 6

	Shorts	Oat-Chop	Barley
Total number of pigs.....	25	25	25
Number of days on test.....	56	56	56
Weight at beginning.....	647	625	815
Final weight.....	1,907	1,835	1,953
Total gain.....	1,260	1,210	1,138
Average gain per hog.....	50.4	48.4	45.5
Average daily gain per hog.....	0.90	0.86	0.81
FEED CONSUMED			
Shorts at \$1.30 per 100 lbs.....	2,424		
Oat-chop at \$1.12 per 100 lbs.....		2,434	
Barley at \$1.66 per 100 lbs.....			2,490
Whey, at 10c. per 100 lbs.....	2,940	2,940	2,968
Buttermilk at 17c. per 100 lbs.....	2,808	2,808	2,968
Skim milk at 20c. per 100 lbs.....	2,704	2,438	2,968
Tankage at \$2.37 per 100 lbs.....	43	43	43
Meal required to produce 100 lbs. gain.....	192	201	218
Cost to produce 100 lbs. gain.....	\$ 3 41	3 37	4 94

The summary of the five experiments with shorts, oat-chop and barley fed with each of the following: whey, skim-milk, buttermilk, tankage, and water—indicate that, from the standpoint of gains, shorts is the best all-round feed for growing young pigs, followed by oat-chop and then barley. From the standpoint of cost, oat-chop at \$1.12 per hundred is cheaper than shorts at \$1.30 a hundred. Barley at \$1.66 per hundred is an expensive feed when oat-chop or shorts can be purchased at the above price. The above prices were the current prices of the above meals during June and July, 1921.

SHORTS AND OAT-CHOP VS. SHORTS AND BARLEY VS. BARLEY AND OAT-CHOP FOR GROWING
HOGS ON PASTURE

Project 16.—An experiment was carried out to determine which combination of feeds was best for young hogs on pasture. Six lots of hogs were used, and two received equal parts shorts and oat-chop, one being fed whey and the other buttermilk. Two lots were also fed equal parts shorts and barley, one being fed whey and the other buttermilk. Similarly, two lots were fed equal parts barley and oat-chop, one getting whey and the other buttermilk.

TABLE No. 7

	Shorts and Oat-chop		Shorts and Barley		Barley and Oats	
	Whey	Butter- milk	Whey	Butter- milk	Whey	Butter- milk
Number of pigs in lot.....	5	5	5	5	5	5
Number of days on test.....	56	56	56	56	56	56
Initial weight.....Lbs.	164	193	123	180	176	156
Final weight.....“	384	489	348	444	415	429
Total gains.....“	220	296	225	264	239	273
Average gain per hog.....“	44	59.2	45	52.8	47.8	54.6
Average daily gain per hog.....“	0.78	1.05	0.80	0.94	0.85	0.97
FEED CONSUMED:						
Shorts at \$1.30 per 100 lbs.....Lbs.	250	250	250	250		
Oat-chop at \$1.12 per 100 lbs.....“	250	250			250	250
Barley at \$1.66 per 100 lbs.....“			250	250	250	250
Whey at 10c. per 100 lbs.....“	3,000		3,000		3,000	
Buttermilk at 17c. per 100 lbs.....“		3,000		3,000		3,000
Meal required to produce 100 lbs. gain “	227	168	222	189	209	183
Total cost.....\$	9 05	11 15	10 40	12 50	9 95	12 05
Cost to produce 100 lbs. gain.....\$	4 11	3 76	4 62	4 73	4 16	4 41

With whey, barley and oat-chop have given the best results. The gains are considerably greater and the cost is .05 cents more per pound gain. Shorts and barley have proved the most expensive combination, with shorts and oat-chop the cheapest. With buttermilk, shorts and oat-chop have given the greatest gains of all, followed by barley and oats. Not only have shorts and oat-chop given the greatest gains, but also the cheapest.

In the following table the average of the two lots, fed whey and buttermilk with each of the three combinations of feed, is given:—

	Total Gains	Cost per 100 lbs. Gain	
		\$	cts.
Shorts and oat-chop with whey and buttermilk.....	516	3	91
Shorts and barley with whey and buttermilk.....	489	4	68
Barley and oats with whey and buttermilk.....	512	4	29
			Meal per 100 lbs. Gain
			198
			206
			191

It is found that, in the average of the two lots, shorts and oat-chop have given the greatest gains, and also much cheaper gains. Barley and oats follow very closely in gains made, but not so closely in cost. Shorts and barley give the least gains at a much greater cost per hundred pounds of gain. It is found that the two lots fed oats have made the cheapest gains as well as to have given the greatest gains.

WHEY, BUTTERMILK, SKIM-MILK, TANKAGE OR WATER ONLY FOR YOUNG PIGS

Project 96.—Method—Tables 1 to 5, in which whey, buttermilk, skim-milk, tankage and water are each fed with shorts, barley and oats. Thus, three lots received whey, buttermilk, skim-milk, tankage or water, and the following table gives the totals and the average for those three lots as compared with three lots in each instance, making 15 in all, fed to each of the above five supplementary feeds.

TABLE No. 8

	Whey	Skim-milk	Buttermilk	Tankage	Water
Number of pigs in lots.....	15	15	15	15	15
Number of days on test.....	56	56	56	56	56
Weight at beginning.....Lbs.	442	456	392	419	378
Final weight.....“	1,228	1,299	1,243	1,055	870
Total gains.....“	786	843	851	636	492
Average gain per hog.....“	52.4	56.2	56.6	42.4	32.8
Average daily gain per hog.....“	0.95	1.00	1.01	0.75	0.08
FEED CONSUMED*					
Shorts at \$1.30 per 100 lbs.....“	490	463	468	490	513
Barley at \$1.66 per 100 lbs.....“	498	498	498	498	498
Oats at \$1.12 per 100 lbs.....“	490	473	468	490	513
Whey at 10c. per 100 lbs.....“	8,848				
Skim milk at 20c. per 100 lbs.....“		8,110			
Buttermilk at 17c. per 100 lbs.....“			8,584		
Tankage at \$2.37 per 100 lbs.....“				129	Water
Meal required to produce 100 lbs. gain.....“	188	170	168	289	309
Cost to produce 100 lbs. gain.....\$	3 68	4 24	4 01	3 62	4 19

A comparison of the gains made show these feeds to take the following order:—

	Gains	Cost per 100 lbs. Gain
	lbs.	\$ cts.
1—Buttermilk.....	851	4 01
2—Skim-milk.....	843	4 24
3—Whey.....	786	3 68
4—Tankage.....	636	3 62
5—Water.....	492	4 19

Buttermilk and skim-milk have given practically the same gains, with only a slight gain in favour of the buttermilk. Though the skim-milk is slightly higher in feed value, the buttermilk appeared to have a beneficial effect on the digestive organs, keeping the young pigs in a thriftier condition, and it required less meal for a pound of gain with the buttermilk fed hogs. Whey has not given as great gains as skim-milk or buttermilk, and it required 20 pounds more grain for every hundred pounds of gain. Tankage gave much lower gains than the liquid supplements, and with water the gains are about half as great as the buttermilk gains.

As regards the cost per hundred pounds of gain, tankage leads, with a cost of \$3.62 per hundred pounds. Though the cost is less with tankage, the gains are not great enough to make it the best supplementary feed for young growing pigs, as at the age of two to four months greater gains at a little more cost pay better than smaller gains at a smaller cost. Whey follows after tankage as to cost of gains, and as the gains are 786 pounds as compared with 851 for buttermilk, whey is the cheapest feed of all. It gives good gains at a comparatively low cost. Buttermilk and skim-milk have given the greatest gains, but at a greater cost than the whey. Of the two, buttermilk has given the greater gains at a lesser cost. Water and meal is a costly ration, and the gains made are not such as would justify the practice of feeding water and meal alone to young growing pigs.

COMPARISON OF WHEY, BUTTERMILK, SKIM-MILK, TANKAGE AND WATER WHEN FED WITH SHORTS, OAT-CHOP AND BARLEY AS TO GAINS MADE AND COST PER 100 POUNDS GAIN

TABLE No. 9

	Shorts		Oat-Chop		Barley	
	Average Gain per Hog per Day	Cost of 100 lbs. Gain	Gain	Cost	Gain	Cost
Whey (from Table 1).....	0.99	\$ cts. 3 34	0.95	\$ cts. 3 14	0.85	\$ cts. 4 69
Buttermilk (from Table 3).....	1.00	3 86	0.99	3 64	1.05	4 51
Skim-milk (from Table 2).....	0.99	4 15	0.99	3 66	1.03	4 89
Tankage (from Table 4).....	0.80	3 29	0.77	3 00	0.70	4 73
Water (from Table 5).....	0.71	3 31	0.61	3 32	0.42	7 00

This table is compiled for the purpose of showing which of the five commonly used supplementary feeds gives the greatest gains most economically when fed along with each of the three meals, shorts, oat-chop and barley. With shorts the gains with whey, skim-milk and buttermilk are practically the same, but the cost is more with the skim-milk and buttermilk. It would therefore appear that whey is the cheapest all-round supplement with shorts. With oat-chop, skim-milk and buttermilk have given the same gains at practically the same cost. With barley, buttermilk has given the greatest gains at a lower cost than either whey or skim-milk. In all the lots, tankage and water have not made as large gains, though at lesser cost in all except the barley-fed lots. Even considering the lower cost, it is doubtful if the gains are large enough to justify feeding tankage and water alone with the grain ration to young growing hogs for eight weeks after weaning.

INSIDE VS. OUTSIDE RAISING OF YOUNG PIGS

Project 97.—Method.—An experiment was carried out to compare the gains made, also the cost of gains and the condition of the hogs when fed indoors as compared with outside on pasture. The hogs on pasture had the run of one-eighth of an acre of oat pasture, and the hogs inside had only a small run 12 feet by 10 feet connected with the pen in the piggery. Two lots were fed indoors, one getting equal parts of shorts and barley with skim-milk, the other getting equal parts shorts and oats with skim-milk. Three lots were fed on pasture, and were fed equal parts shorts and oats, equal parts shorts and barley, and equal parts barley and oats. The pasture-fed hogs were fed buttermilk because no skim-milk was available at the time.

TABLE No. 10

	Inside		Outside on Pasture		
	Shorts, Oats and Skim-milk	Shorts, Barley and Skim-milk	Shorts, Oats and Buttermilk	Shorts, Barley and Buttermilk	Barley, Oats and Buttermilk
Number of pigs in lots.....	5	5	5	5	5
Number of days on test.....	61	61	61	61	16
Weight at beginning of test..... Lbs.	197	190	193	180	156
Weight at end of test..... "	488	497	489	444	429
Total gain..... "	291	307	296	264	273
Average gain per hog..... "	58.2	61.4	59.2	52.8	54.6
Average daily gain per hog..... "	0.95	1.006	1.05	0.94	0.97
FEED CONSUMED:					
Barley at \$1.66 per 100 lbs..... "		265		249	249
Oats at \$1.12 per 100 lbs..... "	265		249		249
Shorts at \$1.30 per 100 lbs..... "	265	265	249	249	
Skim-milk at 20c. per 100 lbs..... "	3,000	3,000			
Buttermilk at 17c. per 100 lbs..... "			2,968	2,968	2,968
Cost for 100 lbs. gain..... \$	4 60	4 50	4 03	5 03	4 70
Amount of meal for 100 lbs. gain.....	182	169	168	188	182

The results from feeding inside when compared with outside feeding show very little difference, either in respect to gains made or cost per pound of gain. Taking an average, it costs 3 cents more per 100 pounds of gain when fed outside and 3.8 pounds more of meal per 100 pounds of gain. The meal required and the cost per 100 pounds of gain are remarkably even.

The greatest difference was found in the condition of the hogs. The inside-fed hogs were very smooth and evenly fleshed, and were finished hogs at the end of the test. On the other hand, the pasture-fed hogs were quite lean, larger, and had a much better development of bone and muscle. Had it been possible to continue this experiment through the final fattening for market, there is no doubt but that the pasture-fed hogs, when confined for fitting, would have made quicker and cheaper gains because they had the frame on which to lay the fat, whereas the inside-fed hogs were already a finished product, and would have to grow as well as fatten.

Project 13.

PROLIFICACY OF DIFFERENT BREEDS OF SWINE

TABLE No. 11—COMPARISON OF THE PROLIFICACY OF YORKSHIRES, BERKSHIRES AND DUROC-JERSEYS AS SHOWN BY THE 1921 LITTERS

	York- shire	Berk- shire	Duroc- Jersey
Number of litters farrowed in 1921.....	12	17	15
Total number of young pigs.....	120	111	123
Average number of young pigs per litter.....	10	6.53	8.2
Total number of young pigs dead at birth.....	20	25	22
Average number of young pigs dead at birth per litter.....	1.6	1.47	1.4
Total number of hairless pigs farrowed.....	20		
Average number of hairless pigs farrowed per litter.....	1.66		
Total number of young pigs died after farrowing.....	76	50	64
Average number of young pigs died after farrowing, per sow.....	6.33	2.94	4.26
Total number of young pigs raised.....	44	61	59
Average number of young pigs raised, per sow.....	3.66	3.59	3.9
Percentage of young pigs raised.....	36.6	54.9	47.9

The claim for the Yorkshire as being the most prolific breed of swine has again been upheld this year by quite a margin, especially as compared with the Berkshires, whose average of 6.53 is very low. In 1920 the Yorkshire was the only breed with no hairless pigs, and in 1921 the tables were turned, the Yorkshires being the only breed with hairless pigs, which in part accounts for the low percentage of Yorkshires raised to maturity. The numbers dead at birth are very even, comparing the three breeds.

Project 58.

TANKAGE IN THE FATTENING RATION FOR HOGS ON PASTURE

TABLE No. 12—FIRST PERIOD OF 28 DAYS

	Lot No. 1	Lot No. 2	Lot No. 3	Lot No. 4
Number of pigs in lot.....	5	5	5	5
Duration of feeding period.....	28	28	8	28
Total weight at beginning Sept. 17..... Lbs.	481	524	472	457
Average weight at beginning Sept. 17.....	96.2	104.8	94.4	91.4
Weight at end of 28 days.....	660	713	656	643
Total gain for period.....	179	189	184	186
Average gain for period.....	35.8	37.8	36.8	37.2
Average daily gain per hog.....	1.28	1.35	1.31	1.33
FEED CONSUMED:				
Barley at 72c. per 100 lbs.....	186	280	168	252
Oats at 74c. per 100 lbs.....	186	280	168	252
Shorts at \$1.30 per 100 lbs.....	186		168	
Buttermilk at 20c. per 100 lbs.....	1,500	1,500	1,500	1,500
Tankage at \$2.37 per 100 lbs.....			56	56
Cost to produce 100 lbs. gain..... \$	4 53	3 74	4 87	4 29
Amount of meal per 100 lbs. of gain.....	312	296	304	301

The results indicate that when buttermilk is fed along with tankage, there is no benefit derived from feeding tankage. It is only an additional expense, as it is the most costly part of the ration. The total gains for the two lots fed tankage is only two pounds greater than the gains for the two lots fed no tankage. The results also indicate that barley and chopped oats in equal parts is a better fattening ration than equal parts barley, chopped oats and shorts. Not only does the barley and chopped oats give larger gains by 12 pounds, but it is a materially cheaper ration. On the two lots, shorts raises the cost of producing a pound of pork an average of .675 cents, a very considerable item.

For the succeeding twenty-seven days these same hogs were fed no buttermilk. They received only water with the meal ration in addition to the pasture. It should, therefore, be remembered that the following results were obtained with the hogs running on oat pasture, which may have modified the differences to some extent.

TABLE No. 13—SECOND PERIOD OF 27 DAYS WITHOUT BUTTERMILK

	Barley, Oat-Chop and Shorts	Barley, and Oat-Chop	Barley, Tankage, Oat-Chop and Shorts	Barley, Oat-Chop and Tankage
Number of pigs in lot.....	5	5	5	5
Duration of feeding period.....	27	27	27	27
Total weight at beginning..... Lbs.	660	713	656	643
Weight at end of 27 days.....	795	867	807	801
Total gain for 27 days.....	135	154	151	158
Average gain per hog for 27 days.....	27	30.8	30.2	31.6
Average daily gain per hog.....	1.0	1.14	1.12	1.17
FEED CONSUMED:				
Barley at 72c. per 100 lbs.....	223	335	200	300
Oat-chop at 74c. per 100 lbs.....	223	335	200	300
Shorts at \$1.30 per 100 lbs.....	223		200	
Tankage at \$2.37 per 100 lbs.....			70	70
Cost to produce 100 lbs. gain..... \$	4 47	3 17	4 74	3 81
Amount of meal per 100 lbs. gain.....	495	438	443	424

When tankage is fed in the ration without buttermilk, the results show a gain in favour of tankage of 20 pounds on the two lots. This relatively small advantage is more than offset by the added cost which the tankage gives to the cost per pound

of production, the average additional cost being .45 cents per pound. As in the previous test, the two lots fed shorts made smaller gains than the two lots fed equal parts barley and oats, and the average cost of the shorts-fed hogs exceeded the average cost of the others by 1.11 cents per pound.

For fattening hogs, the results of the two experiments show that tankage is not a beneficial addition to the ration. The additional cost is more than the additional gains justify. Still further, shorts fed in the same proportion with barley and oats does not give as rapid gains as barley and oats.

Project 19.

TABLE NO. 14—GRAIN HOGGING DOWN EXPERIMENT—BARLEY VS. OATS FOR HOGGING DOWN

Number of Sows	Crop	Days Duration	Area of Grain	Per cent Crop Eaten or Destroyed	Average Weight when put on Grain	Average Weight when Removed	Gain or Loss per Hog	Value of Crop less Threshing	Value of Crop Eaten	Cost per Sow	Cost per Day per Sow
10	Oats	13	1 acre	90%	282.7	272.0	-10.7	\$14.50	\$13.05	\$1.30	0.10
10	Barley	12	.9 acres	30%	274.8	264.2	-10.6	22.68	6.80	0.68	0.065

An experiment as to the advisability, as regards the cost and effect produced, of allowing brood sows to hog down grain was carried out in August and September, 1921. About an acre each of ripened oats and barley were fenced off and ten sows were turned into each lot. During their stay in these lots the sows received nothing else but water, which was provided in a trough and hauled to them daily. Weights of the sows were taken when put on the experiment, and the average for the sows put on oats was 282.7 pounds while those on the barley averaged 274.8 pounds.

At the end of thirteen days the sows in the oats were removed. Their weight was then an average of 272.0 pounds, a loss of 10.7 pounds each in the thirteen days. The oats were almost completely trampled down or about 90 per cent eaten or destroyed. Owing to the dry condition of the soil a large part of the oats, particularly the grain, was trampled into the dry dust and rendered practically useless from a feeding standpoint. It is a question whether better results would not have been obtained had the grain been on firmer ground, and had it not been so ripe that it threshed out very considerably. It was observed that the whole plot of grain was in a trampled down condition.

At the end of twelve days the sows in the barley were removed. Their average weight was then 264.2 pounds, a loss of 10.6 pounds each, almost identical with that of the sows in the oats. However, with the barley only about 30 per cent of the crop had been touched; but this 30 per cent was thoroughly trampled down and almost entirely eaten. The eaten area was confined very largely to one corner of the plot, and a narrow strip around the edges of the plot. It appears that the barley beards proved so hard and rough that the sows did not run through the grain field, but were content to work their way from the sides, and once a part was trampled down they almost completely devoured the heads before trampling down more grain. The barley left standing was in a fit condition to harvest with the binder, whereas the oats were practically trampled out of recognition.

With the lot on barley the results are not conclusive, because it is thought that had the sows been left on for a longer period of time, they would have become more injured to the barley and might have made gains rather than loss. However, with the lot on oats, the results were conclusive, unless a larger area were pastured, which would have brought the cost much higher.

Comparing the cost, it was found that the sows on the oats lot cost 10 cents each per day, while those on the barley cost 6.5 cents each per day. At this rate a brood sow's keep, when not with her litters, would amount to \$26.60 each year. This is exclusive of 14 weeks allowed her for her two litters during which time she would

need extra care and feed. Similarly, the barley sows would each cost \$17.10 for maintenance. Both these costs are too high. The above grain values are reckoned, less the cost of threshing, current price of grain September 30th, 1921.

The conclusion that this experiment affords is that neither oats nor barley are suitable crops to allow of a hogging-down practice. Oats, especially, are not at all well adapted, as they are too easily trampled down and threshed, making the cost much too high. Much better results would be obtained from cutting the grain and threshing it, as the value of the grain at 50 bushels per acre at 29 cents per bushel was \$14.50, and .9 acres barley at 60 bushels at 42 cents per bushel \$22.68.

From the standpoint of gains, the practice is not to be recommended. This holds true with oats, except perhaps for the condition where unlimited grain is available and cost no object. With barley the results are inconclusive from the standpoint of gains made, as the experiment was not continued long enough for results to be decisive.

Project 16a.

TABLE NO. 15—COMPARISON OF YORKSHIRE, BERKSHIRE AND DUROC-JERSEY BROOD SOWS ON PASTURE WITHOUT ANY MEAL WHATSOEVER, ON A PASTURE FROM A MIXTURE OF 3 BUSHELS OATS, 1 BUSHEL PEAS, $\frac{1}{2}$ BUSHELS WINTER RYE AND 6 POUNDS RAPE SEEDED AT THE RATE OF 3 BUSHELS PER ACRE

	York-shires	Berk-shires	Duroc-Jerseys	Totals for all Breeds
Number of sows.....	10	21	10	41
Total number of days on pasture.....	57	57	57	57
Weight when put on pasture.....	4,037	5,726	3,502	13,265
Average weight when put on pasture.....	403.7	272.6	350.2	323.5
Weight when coming off pasture.....	3,874	5,638	3,564	13,076
Average weight when coming off pasture.....	387.4	268.4	356.4	318.9
Total gains on pasture.....	-163	-88	62	-189
Average gains on pasture per sow.....	-16.3	-4.2	6.2	-4.6

The above pasture is an excellent one for hogs. It could be made considerably cheaper by cutting out the peas without lessening the value of the pasture very much, as peas are the expensive part of the seed. The location of this pasture was ideal for hogs. It consisted of about three acres sloping to a slough at the bottom end. At the top end of the field was a clump of willows which gave an excellent shade on hot days, and where the sows could wallow to their hearts' content. The combination of water, shade and good pasture made it an ideal run for sows to cool their blood after the heavy feeding while caring for their litters. It is also worthy of mention that the Yorkshires on this pasture were not at all bothered with sun blistering.

The results of this experiment indicate the rustling powers of the Duroc-Jerseys. It is astonishing that the Durocs actually gained 6.2 pounds each on this pasture, while the Berkshires lost 4.2 pounds each, and the Yorkshires lost 16.3 pounds each. The Yorkshire proved the poorest rustler of the three breeds.

YORKSHIRE VS. DUROC-JERSEY VS. CROSS-BRED YORKSHIRE AND DUROC-JERSEY

Project 98.—Method.—A mixed lot of nineteen fall pigs were run together from weaning until marketed. Of these, ten were pure-bred Duroc-Jerseys, three were pure-bred Yorkshires, and six were cross-bred Yorkshires and Duroc-Jerseys. They were all wintered in two small hog cabins banked around with straw for warmth, and had access to a large yard for exercise. They were fed slop three times daily for two months and then twice daily afterwards. In addition to a meal ration, they were fed green feed and alfalfa with an irregular supply of buttermilk, as it was available. In this experiment the feed was not recorded for the different breeds. They all ran together and had the same chance.

TABLE NO. 16

	Duroc-Jerseys	York-shires	Cross-bred Yorkshire and Durocs	Total
Number of hogs in lot.....	10	3	6	19
Number of days fed.....	137	137	137	137
Initial weight.....Lbs.	330	81	187	598
Average weight....."	33.0	27.0	31.1	31.4
Weight when marketed.....	1,660	501	982	3,143
Average weight when marketed....."	166	167	163.6	165.4
Total gain....."	1,330	420	795	2,545
Average gain per hog....."	133	140	132.5	133.9
Average daily gain per hog....."	0.97	1.02	0.96	0.97
Value of gain sold at \$11.00 per hundred.....\$	146 30	46 20	87 45	279 95
Value of gain per hog.....\$	14 63	15 40	14 57	14 72
FEED CONSUMED				
Shorts at \$14.00 a ton.....Lbs.				1,915
Oilcake meal at \$50.00 per ton....."				750
Barley at 80c. a hundred....."				3,070
Oats at \$1.00 a hundred....."				2,460
Green feed at \$10.00 per ton....."				600
Alfalfa at \$21 per ton....."				200
Buttermilk at 17c. a hundred....."				15,000
Total cost of feed.....\$				111 91
Cost of feed per hog.....\$				5 89
Profit per hog.....\$				8 83
Cost to produce 100 lbs. pork.....\$				4 39
Amount of meal per 100 lbs. of gain.....\$				3 22

In this experiment the pure-bred hogs of both breeds were found to do better than the cross-bred hogs, which is not in accordance with the popular belief that cross-bred hogs do better than pure-bred ones. The Yorkshires did best for the entire period, making a gain of 1.02 pounds per day. The three Yorkshires were all sows, and, as a barrow usually weighs out better than a sow, the Yorkshires were handicapped, but even then did the best. The Duroc-Jerseys follow the Yorkshires, but one Duroc-Jersey took sick and had to be thrown out of the experiment, which should be taken into consideration, as it was unable to rough it with the others. The cross-bred hogs were a fine, vigorous lot and made very uniform and steady gains. For the first two months the Duroc-Jerseys did not seem as hardy as the others, and made much slower gains, but when they got older and received more fattening feed they came along much faster, and during the last month made the largest gains of the three lots.

These hogs were a fine object lesson with regard to the differences in type. The Duroc-Jerseys finished as short, heavy, thickly fleshed hogs. The Yorkshires were in direct contrast, being longer, leaner, and very trim and neat in appearance, but well-finished bacon hogs. Intermediate to these two types were the cross-bred hogs. They were fairly thick and smooth, but yet were of the rangy order and practically all white, with a curl in the hair. They were excellent bacon hogs, and showed that the heavier breed of Duroc-Jerseys could be greatly improved with regard to bacon type when crossed with a good, lengthy Yorkshire.

THE COST OF PRODUCING PORK WITH FALL LITTERS

Project 18—Method.—As it is a common belief among farmers that it does not pay to raise fall litters, the following experiment with four fall litters was carried out in the winter of 1921-22. Four sows farrowed about the middle of September, and their litters were carried through until ready for market, April 4, at which time nineteen selects averaged 165.4 pounds each. In this experiment the cost of the keep of the dams is reckoned from the time that the spring litters were weaned at the end of May until the fall litters were weaned, November 18. The hogs used in this experiment were the same ones that were used in Project 98, wherein the method of feeding is outlined.

TABLE No. 17

4 brood sows on pasture June, July and August, at 50 cents a month per head.. . . .	\$ 2.00
4 brood sows fed for two weeks previous to farrowing 5 pounds meal each per day at one cent per pound.. . . .	2.80
4 brood sows fed for eight weeks after farrowing 8 pounds meal per day at one cent per pound.. . . .	17.92
Allowing \$1 each for service fees.. . . .	4.00
Feed consumed by young pigs—	
Shorts at \$14 per ton.. . . .	Lbs. 1,915
Oilcake meal at \$50 per ton.. . . .	" 750
Barley at 80 cents per hundred.. . . .	" 3,070
Oats at \$1 per hundred.. . . .	" 2,460
Green feed at \$10 per ton.. . . .	" 600
Alfalfa at \$21 per ton.. . . .	" 200
Buttermilk at 17 cents per hundred.. . . .	" 15,000
Total cost of feed for young pigs.. . . .	\$111.91
Total cost, including expenses of 4 sows.. . . .	138.63
Total weight of 19 select hogs, April 4.. . . .	Lbs. 3,134
Value sold as pork at \$11 per hundred.. . . .	\$345.73
Profit from the four litters of 19 hogs.. . . .	207.10
Profit per hog raised.. . . .	10.90
Profit per brood sow.. . . .	51.77
Cost to produce 100 pounds pork.. . . .	4.41
Total meal consumed by sows and pigs per 100 pounds of pork produced.. . . .	3.27

The cost of producing pork with fall litters has proven to be practically the same as with spring litters. The fall litters have given much greater returns because the price per pound was so much higher, being 11 cents as compared with 7½ cents to 9 cents, which was paid at the time when spring litters had to be put on the market to grade as selects. If more hog raisers would raise fall litters, it would help to keep the supply of bacon steady and ensure a more uniform price the year round. For the few who do raise fall litters the price will continue high until a more balanced condition does exist. Under present conditions, fall litters pay best.

FIELD HUSBANDRY

Lacombe being the centre of one of the districts most suitable for live stock in the West, it naturally follows that investigational work with forage crops should form the basic field for field crop experimentation.

Under this division are given the yields of the different field crops for the season 1921, the results of experimental work with ensilage crops, the cost of producing the different farm crops, the results secured in experimenting with different farm rotations, and the results obtained in determining the most suitable cultural methods for maximum crop production and for the conservation of soil moisture and soil fertility.

CROP YIELDS

TABULATION OF YIELDS OF FIELD CROPS

Project 99.—When the exceptionally dry season is considered, good yields of the different farm crops were obtained. A field which yielded 75.4 bushels of oats per acre in 1920 produced 50 bushels of Victory oats per acre in 1921. A 30-acre field of O.A.C. No. 21 barley yielded 50.5 bushels of grain per acre. Hay yields were higher than anticipated; one field yielded 1,973 pounds per acre, while another field which had been in sod for three years produced 1,546 pounds per acre. Green feed did well, one field averaging 2.5 tons per acre. The amount of pasture on native prairie sod was almost negligible, while that obtained from cultivated grasses was light. On the farm proper the pasture was supplemented by winter rye seeded in 1920 and oats and winter rye seeded in the spring of 1921. A large field of sunflowers, consisting of 18.5 acres, yielded 13.5 tons per acre.

ENSILAGE CROPS

COMPARISON OF ENSILAGE CROPS

Project 100.—During the past year 378 tons of ensilage were produced; 60 tons of green oats were placed in the 12-foot by 30-foot silo, 78 tons of corn and 112 tons of sunflowers were placed in the 16-foot by 35-foot round stave silo, and 128 tons sunflowers were cut into a root cellar which has a floor surface of 15 feet by 35 feet. After settling there were 6.5 feet of silage in this cellar. The cost of producing these different crops is given under the heading of "Cost of Producing Farm Crops."

Samples of the sunflower and the oat silage were forwarded to the Dominion Chemist for analysis. The corn was placed in the bottom of the large silo, and is not yet available. The report of this analysis is given below.

SUNFLOWER SILAGE

Greenish brown, fairly fine, mixture of stem and leaf, rather pleasant aromatic odour, sound and in good condition.

	As received	Water-free
Water.. . . .	77.84	....
Crude protein.. . . .	2.64	11.95*
" fat.. . . .	.34	1.57
Carbohydrates.. . . .	10.63	47.94
Fibre.. . . .	5.33	24.96
Ash.. . . .	3.01	13.58
	<hr/> 100.00	<hr/> 100.00
Acidity.. . . .	2.38	
*Albuminoids.. . . .		9.26
Non-albuminoids.. . . .		2.69

OAT SILAGE

Greenish brown, pleasant odour, kernels fairly well filled, sound and in good condition.

	As received	Water-free
Water.. . . .	68.75	....
Crude protein.. . . .	3.18	10.20*
" fat.. . . .	.87	2.78
Carbohydrates.. . . .	14.09	45.09
Fibre.. . . .	10.74	34.36
Ash.. . . .	2.37	7.57
	<hr/> 100.00	<hr/> 100.00
Acidity.. . . .	2.74	
*Albuminoids.. . . .		5.15
Non-albuminoids.. . . .		5.05

The report of feeding tests with these silages is given under the heading "Sunflower vs. Oat Silage for Milk Production" in the live stock division of this report.

As the three silage crops have been grown in an extensive way at this Station, some general remarks as to their suitability for districts with climatic conditions similar to Lacombe would not be out of place.

Oats, or peas and oats, is the standard silage and green feed crop of the northern part of the prairie provinces. The crop is not subject to injury from moderate spring and autumn frosts. No special machinery is essential in producing and harvesting the crop, which may be utilized for either silage, green feed or grain production. The silage produced is of superior quality. When handled judiciously it proves a better cleaning crop than a poorly cared for summerfallow or intertilled crop. However, it does not produce as much tonnage per acre as sunflowers.



Pea and oat green feed, the standard forage of the West.



Corn—a crop that may be used to advantage for the production of silage or dry fodder.

Sunflowers produce a heavier tonnage per acre than any other silage crop. They are not as subject to frost injury as corn. The quality of the silage produced compares favourably with that made from oats or immature corn. Their chief drawback is that they can be utilized as winter feed to advantage only as silage.

Corn is more subject to frost injury than either of the other two silage crops. Yields under field conditions at this Station have averaged over ten tons per acre. The crop may be utilized as dry fodder or as silage, while the land is left in excellent condition for the succeeding grain crop.

DIFFERENT RATES OF SEEDING CORN

Project 101.—This experiment was conducted under field conditions. The corn was seeded with a grain drill on May 27 on old stubble land and was harvested on August 19 with a corn binder. North Western Dent was the variety used. The distance between the rows was obtained by stopping up certain of the seed runs of the drill, while the different rates of seeding, where the rows are an equal distance apart, was obtained by setting the drill at so many pecks of oats per acre. As this method is used by many farmers, it was considered that the experiment should give some information as to the correct way to regulate the seed drill to obtain a maximum crop. The results obtained were as follows:—

DIFFERENT RATES OF SEEDING CORN

Distance between Rows	Rate at which Drill was set	Yield per Acre	
		Tons	Lbs.
24 inches.....	8 pecks oats	7	1,743
30 ".....	8 "	4	767
36 ".....	8 "	4	38
42 ".....	8 "	3	160
36 ".....	8 "	4	550
36 ".....	10 "	5	240
36 ".....	12 "	6	749
36 ".....	14 "	6	1,670
36 ".....	16 "	7	29
36 ".....	18 "	6	1,721

The results presented in the above table would indicate that where corn is grown on old stubble land the heavier seeding produces the best results. When the amount of seed used is considered, setting the drill at 12 pecks of oats and seeding the rows 36 inches apart appear to give the most satisfactory results.

In another field of spring-ploughed sod, three varieties were compared. Squaw corn yielded at the rate of 13 tons 368 pounds per acre. Brandon-grown North Western Dent yielded 13 tons 180 pounds per acre, and commercial North Western Dent seed yielded 9 tons 1,580 pounds per acre.

COMPARISON OF DIFFERENT RATES OF SEEDING SUNFLOWERS

Project 102.—This experiment was conducted under field conditions, being a portion of the main farm crop. The sunflowers were seeded with a grain drill on May 9 on old wheat land and were harvested on September 14 with a corn binder. Giant Russian was the variety used. The drill was regulated in the same manner as outlined in the experiment in seeding corn at different rates. The results obtained were as follows:—

DIFFERENT RATES OF SEEDING SUNFLOWERS

Distance between Rows	Rate at which Drill was Set	Yield per Acre	
		Tons	Lbs.
24 inches.....	6 pecks oats	11	1,375
30 ".....	6 "	11	750
36 ".....	6 "	10	20
42 ".....	6 "	9	1,847
36 ".....	6 "	8	1,862
36 ".....	8 "	9	348
36 ".....	10 "	8	1,375
36 ".....	12 "	7	1,012
36 ".....	14 "	8	55
36 ".....	16 "	9	70
36 ".....	18 "	10	711

In another experiment the plants were thinned to 3, 6, 9, 12 and 15 inches apart in the row. The results obtained were as follows:—

Distance between Plants in the Row	Yield per Acre	
	Tons	Lbs.
3 inches.....	11	825
6 ".....	10	335
9 ".....	9	1,505
12 ".....	8	1,015
15 ".....	8	1,845

The results obtained in the above experiment are directly opposed to the advice usually distributed to farmers. It has always been recommended that sunflowers should be thinned to approximately eight inches apart in the row. The results of the two above experiments would indicate that thicker seeding will produce higher yields than the thinner seeding. In addition to this, the thick seeding keeps the sunflowers down to such a height that they can be more easily cut with a corn binder, with the result that the sheaves are not too top heavy or unwieldy to handle when hauling. There was no appreciable difference in the maturity of the different distances of thinning, as they were all immature when harvested.

COMPARISON OF DISTANCES TO THIN SWEDES

Sutton's Champion was the variety used in this experiment. They were seeded on May 21 and harvested on October 7, and, as indicated in the results, produced an excellent yield. The results obtained were as follows:—

Distance between		Yield per Acre	
Rows	Plants	Tons	Lbs.
30 inches.....	12 inches.....	22	220
30 ".....	10 ".....	22	616
30 ".....	8 ".....	20	1,976
30 ".....	6 ".....	20	260
30 ".....	4 ".....	23	860

It will be noticed that the thinner thinning gave the heaviest yields, with the exception of those thinned to 4 inches apart. It is doubtful whether leaving the plants so thickly in the row can be recommended, as the roots which grew so thickly in the row were smaller, had many more small roots and consequently much more soil stuck to them, were inferior in quality, and were much harder to harvest.

COMPARISON OF DISTANCES AT WHICH TO THIN MANGELS

The effect of thick versus thin seeding on carrots is directly opposite to the effect than with the swedes. In addition to producing a larger tonnage per acre, the mangels, which were thinned to 12 inches apart, produced roots of better quality which were considerably more easily harvested. The results obtained were as follows:—

Distance apart		Yield per Acre	
Rows	Plants in Rows		
		Tons	Lbs.
30 inches.....	12 inches.....	15	96
30 ".....	10 ".....	12	288
30 ".....	8 ".....	12	156
30 ".....	6 ".....	10	1,648
30 ".....	4 ".....	14	776

Yellow Intermediate was the variety used in this experiment.

COMPARISON OF DISTANCES TO THIN FIELD CARROTS

Project 103.—In this experiment the Danish Champion variety was used. The results obtained were as follows:—

Distance apart		Yield per Acre	
Rows	Plants in Rows		
		Tons	Lbs.
30 inches.....	4 inches.....	10	1,648
30 ".....	6 ".....	8	1,952
30 ".....	8 ".....	7	652
30 ".....	10 ".....	6	408
30 ".....	12 ".....	5	1,484

The effect of thick versus thin seeding on carrots is directly opposite to the effect it has on mangels and swedes. In this case, the greater the space between the plants in the row, the lower the yield, and leaving the plants closer in the row resulted in an increased yield.

CROP ROTATIONS

COMPARISON OF DIFFERENT CROP ROTATIONS

Project 104.—These rotations were started in 1914 with the object of supplying farmers with information on this vital subject when it should be needed, and the summary as presented is the result of eight years' experimentation. It is possible that the full value of these rotation experiments has not been fully appreciated, and for that reason the reader is referred to the summary which gives the effect of the preceding crop on the profitableness of following crops.

It will be noticed that the rotations are, with one exception, not adapted for straight grain-growing. This Station serves a mixed farming district and the rotation was planned accordingly.

The following are the rotations being compared at this Station.

ROTATION L OR MAIN FARM ROTATION

First year.—Hay.

Second year.—Pasture, manure, 12 tons per acre.

Third year.—Pasture. Broken in July 6 inches deep and cultivated for balance of season.

Fourth year.—Oats, or oats and peas for silage.

Fifth year.—Oats.

Sixth year.—Barley seeded down with different grass mixtures.

This rotation covers approximately 240 acres of land, and has a distinct advantage for localities where the precipitation is such that too heavy a growth of straw results from summer-fallowing. The fall cultivation given with the summer-ploughed sod is sufficient to product an excellent crop without rendering so much plant food available that lodging in the succeeding crop is a serious consideration.

As indicated in the preceding report, only manure in which all viable weed seeds have been destroyed by the manure being well rotted is used. In districts where the rainfall is light, much injury may be done if the manure is applied in large quantities and not properly spread. Under such conditions, there is not sufficient moisture available to cause the manure to rot quickly, and the soil is thus kept open and will dry out badly. On the other hand, well rotted manure applied in light coatings and evenly distributed will give profitable results in any district. Where manure spreaders are not available, the manure, after being carefully spread by hand, may be given a stroke with the harrow and thus left in good shape for ploughing under. To facilitate the prevention of manure in "chunks," all straw used for bedding at this Station is first run through the cutting box. This makes the bedding more easily handled, and renders it a better absorbent. The method can be recommended for those who have a cutting box available.

It has been found that meadows of either wild or cultivated grasses prove unsuitable as pasture for high producing dairy cows. During the past season these pastures were supplemented with winter rye pasture which was seeded the previous autumn, and a pasture consisting of oats and winter rye seeded together in the spring. The latter mixture, seeded at the rate of 2 bushels of oats and 1½ bushels of winter rye per acre, will provide a continuous supply of succulent pasture from the time the crop is six inches high until after the ground is frozen. The winter rye may be used the following year for either pasture, silage, green feed or grain production. Where such a mixture is used the area required for pasture purposes is materially reduced.

The extremely dry growing seasons which have prevailed during recent years have emphasized one objection to this rotation; the crop in which the seeding down is done is not preceded by a suitable preparatory crop. In this rotation the main oat crop is used. The spring and fall cultivation given the land when oats or peas and oats are used as the cleaning crop would put the seed bed in better condition to receive the grass seed.

ROTATION K

First year.—Hoed crop.

Second year.—Wheat.

Third year.—Barley seeded down.

Fourth year.—Hay, manure, 12 tons per acre.

Fifth year.—Pasture.

Sixth year.—Pasture. Broken in July 6 inches deep and cultivated for balance of the season.

There might be three objections to this rotation; it has only two cash crops, it has three years in sod, and the amount of land devoted to hoed crops might be more than the average farmer would care to use for that purpose. However, with the introduction of corn and sunflowers for silage, and the use of oats, or peas and oats, for green feed, the land allotted to hoed crops might be profitably utilized for the production of these crops.

ROTATION O

First year.—Hoed crop.

Second year.—Wheat.

Third year.—Oats.

Fourth year.—Summer-fallow.

Fifth year.—Barley, seeded down.

Sixth year.—Hay.

Seventh year.—Pasture. Broken in July, 6 inches deep and cultivated for the balance of the season.

This rotation is better than "L" in one respect: the crop in which the seeding down is done follows the summer-fallow, but in a year with a reasonable amount of rainfall this crop usually lodges. However, the last four years have been quite dry, and the yields on summer-fallowed land have been higher and more profitable than those produced on stubble land. Moreover, summer-fallow is ready in the spring, and there is no delay in seeding results.

As it stands, rotation "O" might be objectionable because one-seventh of the land is in hoed crop and one-seventh in summer-fallow, and only three years out of the seven produce cash crops. As is the case with rotation "K" this point might be improved by the production of the different silage crops as cleaning crops instead of hoed crops such as roots and potatoes. If the hoed crop year was devoted to annual pasture and the summer-fallow year utilized as described above, and the year in cultivated grass pasture omitted, the two unprofitable years, those in summer-fallow and pasture, would be eliminated and the rotation would be the most profitable one under test, and would also keep the soil reasonably free from foul weeds and in good tilth.

ROTATION C

First year.—Summer-fallow.

Second year.—Wheat.

Third year.—Wheat.

This rotation is a straight wheat growing rotation, and while it has been fairly profitable, it has demonstrated that such a rotation is not a durable one for this district. In this rotation, the yield from the crop following the summer-fallow has been 35.5 bushels per acre and has been the second most profitable crop grown at this Station; while the second wheat crop after summer-fallow averaged 19.8 bushels per acre and has been the eighth most profitable crop grown.

It must be borne in mind that the land, when this rotation was started, was almost virgin soil; on older land the results might have been less favourable. As it was, although the land was thoroughly summer-fallowed every third year, the weeds have not been held completely in check, and the root fibre in the soil has been rapidly depleted. In fact the land comprising this rotation was in such condition that it was deemed advisable to produce a hoed crop on it in 1921 and thus avert some of the impending soil troubles.

In computing the cost of production of field crops the following values have been used. These values are based on current prices in 1921.

RETURN VALUES

Wheat (from the machine)	per bushel	\$ 1 04
Barley " " "	" "	39
Oats " " "	" "	27
Potatoes	" "	40
Hay	" ton	15 00
Green feed	" "	10 00
Silage crops	" "	4 00
Straw	" "	3 00
Pasture	" month	1 00

COST VALUES

Rent and manure	" acre	4 00
Seed wheat	" bushel	2 00
Seed barley	" "	1 00
Seed oats	" "	75
Seed potatoes	" "	1 00
Timothy seed	" pound	18
Alfalfa seed	" "	75
Rye grass seed	" "	20
Red clover seed	" "	40
Alsike clover seed	" "	40
Use of machinery	" acre	60
Kerosene	" gallon	30
Gear oil	" "	1 05
Twine	" pound	20
Threshing (covering work from stook to granary)—		
Wheat	" bushel	12
Barley	" "	10
Oats	" "	08
Manual labour	" hour	35
Horse labour (four-horse team)	" "	35

ROTATION "L" OR MAIN FARM ROTATION, 1921

COST VALUES

Rotation Year	Crop	Area ac.	Rent and Manure \$ c.	Seed, Twine and use of Machinery \$ c.	Cost of Manual Labour \$ c.	Value of Horse Labour \$ c.	Cost of Threshing \$ c.	Total Cost \$ c.	Cost for one Acre \$ c.	Cost for one Bushel \$ c.	Cost for one Ton \$ c.	Grain \$ c.	Straw \$ c.	Hay or Hoed Crop \$ c.	Total Value \$ c.	Value of Crop per Acre \$ c.	Profit or Loss per Acre \$ c.
1	Hay and green feed.....	41.97	167.88	404.86	116.20	39.90	.....	728.84	17.35	.....	.....	.....	.....	52.000	972.88	23.18	-5.83
2	Pasture and hay.....	35.4	141.60	21.24	57.57	9.80	.....	230.21	6.50	.....	.....	20 cows	15 days	116.576	533.95	15.08	8.57
3	Hay.....	31.57	126.28	18.94	68.08	20.91	.....	234.21	7.42	.....	10.00	.....	.....	48.820	366.15	11.60	4.18
4	Oats green feed.....	39.16	156.64	127.62	88.90	112.35	.....	485.51	12.39	.....	.....	20 cows	past 66 days	120.000	644.00	16.42	4.03
5	Oats.....	37.81	151.24	104.68	113.75	92.58	152.00	614.25	16.25	32.5	.....	64,600	60,000	.....	603.00	15.95	-0.30
6	Barley.....	29.69	118.76	81.72	92.75	66.90	150.00	510.13	17.18	34.0	.....	72,000	64,000	.....	681.00	22.93	5.75

ROTATION "L"

RETURN VALUES

Year	First Year, Hay \$ cts.	Second Year, Pasture \$ cts.	Third Year, Pasture \$ cts.	Fourth Year, Oats, Greenfeed \$ cts.	Fifth Year, Oats \$ cts.	Sixth Year, Barley \$ cts.	Average Profit per acre \$ cts.
1914.....	5.75	0.05	-4.24	15.27	11.01	3.76	5.34
1915.....	13.53	-2.72	-1.44	16.93	12.71	6.75	7.63
1916.....	11.10	-4.87	-5.02	21.70	12.82	6.14	6.98
1917.....	7.27	-1.94	-0.99	9.13	10.54	4.62	4.77
1918.....	-1.75	-0.53	1.09	7.87	-0.41	0.61	1.15
1919.....	7.39	-5.13	-0.95	19.35	19.78	30.02	11.74
1920.....	5.90	0.28	-0.74	17.05	2.83	14.58	6.65
1921.....	-5.61	8.57	4.18	4.03	-0.30	5.75	2.77
Average.....	5.45	-0.79	-1.01	13.97	8.63	9.03	5.88

Average profit per acre per year for entire area—\$5.88.

ROTATION "K", 1921

COST VALUES

Rotation Year	Crop	Area ac.	Rent and Manure	Seed, Twine and use of Machinery	Value of Manual Labour	Value of Horse Labour	Cost of Threshing	Total Cost	Cost for one Acre	Cost for one Bushel	Cost for one Ton	Grain	Straw	Hood Crop or Hay	Total Value	Value of Crop per Acre	Profit or Loss per Acre
6	Pasture.....	3.56	14 24					12 24	4 00						5 30	1 49	-2 51
1	Hood crop (corn).....	3.5	14 00	6 90	44 80	17 85		83 55	23 87		2 77			60 330	120 66	34 47	10 60
2	Wheat.....	3.41	13 64	15 25	9 62	5 25	12 48	56 24	16 49	0 50		6 240	10 490		123 88	36 33	19 84
3	Barley.....	3.53	14 12	10 92	10 22	7 35	12 35	54 96	15 57	0 443		5 330	7 090		58 78	16 65	1 08
4	Hay.....	3.63	14 52	38 72	8 75	3 15		65 14	17 94					7,130	53 48	14 73	-3 21
5	Pasture.....	3.6	14 40					14 40	4 00						4 50	1 25	-2 75

ROTATION "K"

RETURN VALUES

Year	First Year, Hood Crop	Second Year, Wheat	Third Year, Barley	Fourth Year, Hay	Fifth Year, Pasture	Sixth Year, Pasture	Average Profit per acre
1914.....	\$ cts. 13 95	\$ cts. 23 10	\$ cts. 4 35	\$ cts. 14 70	\$ cts. -3 29	\$ cts. -4 98	\$ cts. 7 97
1915.....	11 02	31 49	11 01	9 70	-4 40	-3 92	9 10
1916.....	3 07	5 78	4 14	9 82	-4 55	-5 00	2 21
1917.....	3 18	4 79	7 98	11 72	-4 26	-4 61	3 13
1918.....	4 45	5 44	10 81	8 86	-5 10	0 59	4 18
1919.....	14 71	15 44	17 87	6 64	-10 70	-10 36	5 60
1920.....	-9 65	25 07	-0 88	-6 63	4 90	6 63	3 23
1921.....	10 60	20 13	1 08	-3 21	-2 75	-2 51	3 89
Averages.....	6 42	16 40	7 05	6 44	-3 77	-3 02	4 92

Average profit per acre per year for entire rotation—\$4.92.

Cost Values

Rotation Year	Crop	Area ac.	Rent and Manure \$ c.	Seed, Twine, and use of Machinery \$ c.	Cost of Manual Labour \$ c.	Value of Horse Labour \$ c.	Cost of Threshing \$ c.	Total Cost \$ c.	Cost for one Acre \$ c.	Cost for one Bushel \$ c.	Cost for one Ton \$ c.	Grain \$ c.	Straw lb.	Hay lb.	Hoed Crop lb.	Total Value \$ c.	Value of Crop per Acre \$ c.	Profit or Loss per Acre \$ c.
1	Potatoes.....	2.42	9 68	39 45	81 20	24 41	.....	154 74	63 94	0 53	.....	.....	.....	.....	17,345	115 95	47 91	-16 03
2	Wheat.....	2.42	9 68	10 34	7 18	3 67	9 72	40 59	16 77	0 50	.....	4,865	4,175	.....	.....	90 60	37 44	20 67
3	Oats.....	2.42	9 68	6 40	7 70	4 37	8 32	36 47	15 07	0 35	.....	3,530	4,205	.....	1,050 cut gr'n	36 48	15 07	.....
4	Summer fallow.....	2.42	9 68	1 45	8 92	6 21	.....	26 26	10 85	.....	.....	.....	.....	.....	.....	.....	.....	-10 85
5	Barley.....	2.42	9 68	7 85	9 10	7 00	10 63	44 56	18 41	0 41	.....	5,250	5,060	.....	.....	50 10	20 70	2 29
6	Hay.....	2.42	9 68	22 75	5 16	2 45	.....	40 04	16 55	.....	21 47	.....	.....	6,480	.....	48 60	20 08	3 53
7	Pasture and hay.....	2.42	9 68	1 45	2 10	1 05	.....	14 28	5 90	.....	.....	.....	.....	5,000	.....	37 50	15 50	9 60

ROTATION "O"

RETURN VALUES

Year	1st year Hoed Crop	2nd year, Wheat	3rd year, Oats	4th year, Summer- fallow	5th year, Barley	6th year, Hay	7th year, Pasture	Average Profit per year
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
1914.....	58 19	23 64	17 75	-9 20	9 78	-4 22	-4 22	13 10
1915.....	7 17	45 07	19 03	-8 31	15 14	14 95	-4 33	12 67
1916.....	-4 20	13 21	25 40	-8 31	5 51	16 58	-4 75	6 21
1917.....	10 22	27 06	17 38	-7 78	21 58	14 97	-3 21	11 46
1918.....	10 77	4 78	4 60	-6 04	15 00	-2 69	-2 79	3 38
1919.....	13 40	40 79	28 91	-16 24	39 05	-9 50	-9 94	12 35
1920.....	6 39	32 07	11 25	-9 25	4 17	0 36	-1 36	6 23
1921.....	-16 03	20 67	.....	-10 85	2 29	3 53	9 60	1 32
Average.....	10 74	25 91	15 54	-9 50	14 06	4 25	-2 64	8 34

Average profit per acre per year for entire rotation—\$8.34.

ROTATION "C"

RETURN VALUES

Year	1st year Summer- fallow	2nd year, Wheat	3rd year, Wheat	Average Profit per acre
	\$ cts.	\$ cts.	\$ cts.	\$ cts.
1914.....	-6 37	14 75	13 92	7 43
1915.....	-10 07	5 61	8 93	1 46
1916.....	-8 74	16 35	2 21	3 27
1917.....	-8 61	11 79	9 38	4 19
1918.....	-7 36	18 62	-3 71	2 52
1919.....	-8 57	51 80	38 04	27 09
1920.....	-9 40	14 66	2 75	2 67
1921.....	.....	.....	.....	.....
Averages.....	-8 45	19 08	10 22	6 95

Average profit per acre per year for entire rotation—\$6.95.

PROFIT OR LOSS PER ACRE FROM THE DIFFERENT FARM CROPS AS GROWN IN THE DIFFERENT ROTATIONS

Crop	Preceding Crop	Rotation	Number of years' average	Profit per acre	Loss per acre
				\$ cts.	\$ cts.
Wheat.....	Hoed crop.....	O	8	25 91	
Wheat.....	Summer-fallow.....	C	7	19 08	
Wheat.....	Hoed crop.....	K	8	16 40	
Oats.....	Wheat.....	O	8	15 54	
Barley.....	Summer fallow.....	O	8	14 06	
Oats for green feed.....	Pasture.....	L	8	13 97	
Hoed crop.....	Pasture.....	O	8	10 72	
Wheat.....	Wheat.....	C	7	10 22	
Barley.....	Oats.....	L	8	9 03	
Oats.....	Oats for green feed.....	L	8	8 63	
Barley.....	Wheat.....	K	8	7 05	
Hay.....	Barley.....	K	8	6 44	
Hoed crop.....	Pasture.....	K	8	6 42	
Hay.....	Barley.....	L	8	5 45	
Hay.....	Barley.....	O	8	4 25	
Pasture.....	Hay.....	L	8		0 79
Pasture.....	Pasture.....	K	8		1 01
Pasture.....	Hay.....	O	8		2 63
Pasture.....	Pasture.....	K	8		3 02
Pasture.....	Hay.....	K	8		3 77
Summer-fallow.....	Wheat.....	C	7		8 45
Summer-fallow.....	Oats.....	O	8		9 50

The tables presenting the data of the average profit or loss per acre from the different field crops as grown at this Station bring out the point that the cereals are the most profitable crops for this district. Of the cereals, wheat stands above all others in the profit per acre produced, and emphasizes the point that in planning the rotation for a system of diversified farming, wheat should be featured as the main cash crop, while other crops should be so arranged that they serve as preparatory crops for the main wheat crop.

It will be noticed that the profitableness of the wheat crop depends to a large extent on the preceding crop. Unless a suitable hoed crop can be utilized, summer-fallowing is the logical treatment to give the land to produce the most profitable crop. The data compiled to date indicate that a suitable hoed crop can usually be produced at a profit. As the yields of grain obtained from land that has produced a hoed crop compare favourably with those produced on summer-fallowed land, it naturally follows that any hoed crop that will improve the tilth and the fertility of the soil and still produce a small profit would be preferable to the expensive method of summer-fallowing. The silage crops, corn, sunflowers and peas and oats or oats alone will do this.

It will also be seen that the pasture years have always produced a loss, and that the year in hay has not been a very profitable one; also, that the crop of green feed has been much more profitable than either the crop of hay or the year in pasture. This would indicate that a suitable annual forage crop might be profitably substituted for the cultivated grasses during the years that the land was in sod.

In summarizing the data compiled in our rotation experiments, it might be well to point out that there is no best rotation for all farms and localities. Each individual farm has its own peculiar conditions. The soil, the degree of weed infestations the distance from markets, the amount of rainfall and the ability and experience of the farmer will all vary. For these reasons, the table showing the profit and loss produced by the different crops and the apparent influence of the preceding crop on the one following should be of material value in assisting each farmer to outline a rotation that would be most suitable for his own particular conditions.

COST OF PRODUCING FARM CROPS

The figures quoted in this statement are taken from the rotation experiments, as the values used in calculating the profit or loss per acre are representative for the district.

Crop	Area	Cost
	acres	\$ cts.
Wheat (Ruby).....	3.41	0 50 per bushel
Wheat (Marquis).....	2.42	0 50 "
Barley (O. A. C. No. 21).....	29 69	0 34 "
Barley ".....	2.42	0 41 "
Barley ".....	3.53	0 44½ "
Oats (Victory).....	37.81	0 32½ "
Oats (Banner).....	2.42	0 35 "
Hay (Timothy).....	31.57	10 00 per ton
Hay (mixed).....	3.63	21 94 "
Hay (mixed).....	2.42	21 47 "
Green feed (oats).....	42.5	8 23 " dry weight.
Corn (Northwestern Dent).....	3.5	2 77 " green weight.
Sunflowers (Giant Russian).....	18.5	2 66 " " "

It will be noticed that wheat is the only cereal that would show a profit per acre if the straw were not given a valuation. While \$3 per ton may seem a high valuation for straw in the west, it must be borne in mind that a load of straw weighs about 1,000 pounds and this would mean \$1.50 per load, which is not a high valuation.

The explanation for the great difference in the cost of producing hay is caused by the expensive grass and cloverseed mixture which was used on the two fields on which the hay cost over \$20 per ton, while the hay that cost \$10 per ton was the third cutting against which there was no charge for grass seed, and which had produced a fair crop of hay.

During recent years great interest is being taken in the cultivation of sunflowers. Last season, 18.5 acres were grown at this Station. As the field on which these were grown is not included in any of the rotations, a separate statement of costs of production and delivering it in the silo are given in the following statement. These items will vary on different farms, but they will serve to indicate the costs of production on reasonably high priced land.

Item	Statement	Amount
		\$ cts.
Rent of land.....	\$100 per acre at 7 p.c.....	129 50
Seed.....	10 lbs. per acre at 10c.....	18 50
Machinery.....	Depreciation and interest charge \$1.20 per acre.....	22 20
Manual labour.....	776 hours at 35c.....	271 60
Horse labour.....	891 hours at 10c.....	89 10
Twine.....	88 pounds at 20c.....	17 60
Kerosene for tractor.....	132.5 gals. at 30c.....	39 75
Gear oil for tractor.....	8 gals. at \$1.10.....	8 80
		597 05

Yield per acre, 12.4 tons.

Cost per acre, \$32.27

Cost per ton, \$2.60

The division of labour used in producing these sunflowers is given in the following table:—

Operation	Manual labour hours	Horse labour hours
Ploughing.....	44	88
Ploughing (tractor).....	26	
Packing (twice).....	16.5	66
Discing.....	19	76
Harrowing (3 times).....	24	96
Sowing.....	10	40
Hoeing.....	141	
Cultivating.....	101.5	203
Cutting.....	39	117
Hauling.....	119	238
Labour, pitching bundles.....	236	
	776	924

COST OF PRODUCING SUMMER-FALLOW SUBSTITUTES

Project 105.—The plots used in this experiment are one-third of an acre in size. They are long and narrow, so that there would be little waste time in turning. In 1922 these plots will be cross-sown with wheat, oats and barley, so that information will be available as to the effect of these different annual forage crops on the succeeding crop of grain. Accurate account of the labour used in growing these crops was kept. The same values were used as were in use over the entire rotation experiments.

The following table gives the results obtained.

Crop	Yield per acre	Cost per ton
	lbs.	\$ cts.
Corn (Squaw).....	8,850	3 05
Sunflowers (Giant Russian).....	13,455	2 59
Potatoes (Irish Cobbler).....	7,410	0 40 bush.
Rape in rows.....	6,990	4 66
Rape broadcast.....	3,450	6 30
	Dry weights	
Oats and peas.....	3,180	11 87
Peas.....	4,830	6 45
Oats.....	4,080	7 30
Beardless Barley.....	3,150	9 86

The land used in this experiment was ideal in that it was an old field that has been cropped to winter rye and other cereals for a number of years and was badly in need of summer-fallowing. No manure was applied, and the low yields are further explained by the late spring ploughing in a dry year when there was no reserve moisture available in the soil.

It will be noticed that in this experiment the oat and pea mixture did not produce as high yields as either of these crops grown alone.

The low yield of corn, as compared with sunflowers, is the result of the variety of corn grown. Squaw Corn is one of the earliest of the flint varieties, and produces the smallest amount of forage of any. If a heavy yielding sort such as the Northwestern Dent had been used, the results would have been more in favour of corn.

HORTICULTURE

THE SEASON

The season opened with an average spring, the first seeding in the open being done on April 28. The 2.61 inches of precipitation received in April and the 1.69 inches received during the first two weeks in May gave enough moisture for good germination, and all early sown crops made a good start. The balance of May and June were fairly dry, but nearly two inches of rain fell in the seven days June 30 to July 6. This gave everything an excellent start; another 1.95 inches were received during the latter part of July. Comparatively arid conditions prevailed during the months of August and September. The period free from killing frosts was from May 27 to August 26.

VEGETABLES

VARIETY AND STRAIN TESTS OF ASPARAGUS

Project 84.—Two varieties, Eclipse and Palmetto, have been under test since 1917. There seems to be very little difference in these two varieties for this district, as both gave the same yield in 1921.

VARIETY AND STRAIN TESTS OF GARDEN BEANS

Project 85.—Fifteen varieties of beans were tested in 1921. They were sown on May 23 in rows 30 inches apart with the seed 2 inches apart in the row. The results were as follows:—

VARIETY TESTS WITH BEANS

Variety	Date ready for use	Yield from 30-foot row	
		lb.	oz.
Plentiful French O-589.....	July 26	31	19
Extra Early Valentine.....	July 30	26	10
Masterpiece O-589.....	July 30	26	6
Bountiful Bush.....	July 27	26	6
Wardwell Kidney Wax.....	July 26	24	3
Davis White Wax.....	July 30	22	9
Pilot.....	Aug. 8	22	4
Round Pod Kidney.....	July 30	21	13
Stringless Green Pod.....	July 27	21	8
Pencil Pod.....	July 30	20	12
String Green Pod (Burpee).....	July 30	20	0
Refugee.....	July 26	19	2
Hodson Long Pod.....	Aug. 10	15	5
Hidasta.....	Aug. 8	13	4
Kentucky Wonder (pole).....	Aug. 8	13	10

The fruitfulness of the crop was the most pronounced that has been experienced for years. The most outstanding varieties were Plentiful French, Bountiful Bush, Masterpiece and Wardwell Wax.

LATE AND EARLY MATURING VARIETIES vs. DIFFERENT DATES OF SEEDING FOR A CONTINUOUS SUPPLY OF GREEN BEANS

Variety	Sown	Ready for use	Yield from 30-foot row	
			lb.	oz.
Stringless Green Pod.....	May 23	July 30	30	12
Extra Early Valentine.....	May 23	July 30	40	3
Refugee.....	May 23	July 17	18	12
Round Pod Kidney.....	May 23	Aug. 1	33	7
“ “.....	May 30	Aug. 1	30	4
“ “.....	June 6	Aug. 8	21	14
“ “.....	June 13	Aug. 30	2	4

Under average conditions, sowing late and early maturing varieties produces more satisfactory results than are obtained by sowing one variety at different dates. In the different dates of seeding the earliest seeding gave the largest yields and the most satisfactory results.

VARIETY AND STRAIN TESTS OF GARDEN BEETS

Project 83.—Thirteen varieties and strains of beets were tested during the past season. They were sown on May 3 in rows 30 inches apart, and thinned to 3 inches apart in the rows. The results were as follows:—

VARIETY TESTS WITH BEETS

Variety	Yield from 30-foot row		Notes on quality
	lb.	oz.	
Half Long Blood.....	61	..	Fairly good
Early Wonder.....	58	..	Good
New Dandy.....	57	..	Good
Extra Early.....	56	..	Good
Detroit Dark Red O-200.....	55	..	Fair
Crimson Globe.....	55	..	Good
Eclipse.....	54	..	Good
Black Red Ball.....	53	..	Good
Crosby Egyptian.....	50	..	Good
Early Model.....	48	..	Fair
Detroit Dark Red 1096.....	48	..	Large and coarse
Black Red Ball O-245.....	45	..	Good
Eclipse 1095.....	35	..	Fair

All beets were satisfactory, there being very little difference as to the quality of the different varieties.

COMPARISON OF DISTANCES AT WHICH TO THIN BEETS

These beets were sown at the same time as the varieties. Those thinned to 2 inches apart yielded 86 pounds from a 30-foot row, those thinned to 3 inches apart 75 pounds, and those thinned to 4 inches apart 82 pounds. Thinning to 2 inches produced slightly larger yields and roots of superior quality.

VARIETY AND STRAIN TESTS OF BRUSSELS SPROUTS

Project 106.—Four varieties of Brussels sprouts were seeded in 1921. Of these four varieties, only one, Paris Model, germinated. Ten plants of this variety produced 14 pounds. Unless it is a very favourable season, this vegetable does not grow to perfection in this district.

VARIETY AND STRAIN TESTS OF GARDEN CARROTS

Project 83a.—Ten varieties of carrots were grown this year. They were seeded on May 3 in rows 30 inches apart and were later thinned to 2 inches apart in the row. The results obtained were as follows:—

VARIETY TESTS WITH CARROTS

Variety	Yield from 30 foot row		Notes on quality
	lb.	oz.	
Chantenay 1191.....	80	..	Good quality
Oxheart.....	76	..	Very desirable
Hutchinson.....	72	..	Very good
Garden Gem.....	70	..	Good shaped roots of medium size
Chantenay.....	58	..	Very good
Nantes Half Long.....	58	..	Clean uniform roots
Improved Danvers.....	53	..	Poor type
Chantenay O. 246.....	47	..	Fair
Early Scarlet Horn.....	40	..	Good
New Red Intermediate 1113.....	35	..	Were not thinned properly

Carrots are one of the most easily grown vegetables on the prairies. Scarlet Horn is a good early kind, while Chantenay and Oxheart are desirable main crop varieties. There was little difference in the quality of the different varieties.

COMPARISON OF DIFFERENT DISTANCES AT WHICH TO THIN CARROTS

This crop was seeded in the same manner and under the same conditions as those in the variety tests. The variety used was Chantenay, and the following results were obtained:—

Distance apart	Yield from 30 foot row	
	lb.	oz.
1 inch apart.....	70	..
1½ inch apart.....	66	..
2 inch apart.....	77	..

VARIETY AND STRAIN TESTS OF CABBAGE

Project 81.—Twenty varieties of cabbage were tested in 1921; of these only fourteen developed heads. They were sown on April 21, transplanted on May 17, and harvested on October 10. The results obtained were as follows:—

VARIETY TESTS WITH CABBAGE

Variety	Weight of 10 average heads
	lb.
Copenhagen Market.....	170
Flat Swedish 1107.....	110
Amager Roundhead.....	110
Succession.....	100
Danish Ballhead O. 105-15.....	95
Flat Swedish.....	91
Fottler Improved Brunswick.....	88
Marblehead Mammoth.....	85
Delicatesse Red O. 842.....	68
Northern Favourite.....	60
Improved Danish Delicatesse.....	60
Danish Red Stonehead.....	56
Early Paris Market.....	43
Drumhead Savoy.....	27

Three varieties, Brandon Market, Enkhuizen Glory and Early Jersey Wakefield, damped off when the plants were small; the Kildonan did not germinate.

The two varieties of Chinese cabbage were very satisfactory, but owing to the extremely hot, dry summer they bolted to seed rather early. These varieties were Wong Bok and Pe-Tsai.

CONTROL OF ROOT MAGGOT IN CABBAGE

Two varieties were used in this experiment. The preventatives used were tar paper discs and cheese cloths. The results obtained were as indicated in the table following:—

YIELDS FROM TWENTY-FIVE PLANTS

Variety	Protected by tar paper discs	Protected by cheese cloth	No protection
	lb.	lb.	lb.
Jersey Wakefield.....	36	35	32
Copenhagen Market.....	172	162	168

The root maggot was not very plentiful this year, but judging from the above results, the use of tar paper discs appears to be the most satisfactory method of control.

CONTROL OF ROOT MAGGOT IN CAULIFLOWER

Project 81a.—This experiment is similar to the one conducted with cabbage in every respect. The results obtained were decidedly in favour of the tar paper discs.

VARIETY AND STRAIN TESTS OF CELERY

Project 86.—Eight varieties of celery were under test this season. The seed was sown in the hot bed on the 21st of April and transplanted to flats on May 7 and again planted into the open on the 6th of June. It was planted in rows 3 feet apart and 6 inches apart in the row. The results obtained were as follows:—

VARIETY TESTS WITH CELERY

Variety	Ready for use	Yield from 15 foot row
Sandford Superb.....	Oct. 25	lb. 16
Evans Triumph.....	Oct. 30	14
Giant Pascal.....	Oct. 25	12
French Success.....	Oct. 25	12
White Plume.....	Oct. 20	11
Golden Plume.....	Oct. 20	10
Golden Self Blanching.....	Oct. 20	10
Winter Queen.....	Oct. 25	9

This was a most unfavourable season for the growing of good celery, being too hot and dry. Despite these adverse conditions, the yields were very satisfactory. Golden Self Blanching appears to be a standard variety.

COMPARISON OF METHODS OF BLANCHING CELERY

Thirty feet were planted on the flat and blanched with 12-inch boards, and 30 feet were grown in a trench. There was very little difference in yields, but the trench system gave the best quality and crispness.

VARIETY AND STRAIN TESTS OF SWEET CORN

Project 106.—Of the sixteen varieties of garden corn grown in 1921, only eleven produced ears suitable for the table before the frost of September 10 and 11. The corn was planted on May 23 in hills 3 feet apart each way. The results obtained were as follows:—

VARIETY TESTS WITH CORN

Variety	Date ready for use	Number of cobs from 10 average hills
Assiniboine.....	Aug. 27	83 medium large
Pickaninny O. 846-58.....	Aug. 18	73 small
Howes Alberta Flint.....	Aug. 25	71 small
Sweet Kloodman O. 896.....	Aug. 30	59 medium small
Nuetta Sweet.....	Aug. 30	44 medium
Tom Thumb (pop corn).....	Sept. 12	42 very small
Early Malcolm O. 846-58.....	Aug. 30	38 medium small
Will Early Jane.....	Sept. 3	22 medium
Early May Flower.....	Sept. 7	20 small
Sweet Squaw O. 622-26.....	Sept. 7	17 medium
Improved Early Dakota.....	Sept. 7	14 medium large
Extra Early Cory.....		
Evergreen Bantam.....		
Golden Bantam.....		
Early Fordhook.....		
Howling Mob.....		

On September 6 there were 2 degrees frost; on September 10, 4.1 degrees; and on the 11th, 13.1 degrees. The last five varieties had not produced ears mature enough for table purposes by this date.

The most satisfactory varieties were Assiniboine and Nuetta. Pickaninny was the earliest. For some reason the Early Malcolm did not come up to its usual standard of perfection.

VARIETY AND STRAIN TESTS OF CITRON

Project 107.—Four different varieties were tested. The seed was sown in the cold frames on May 16 and planted out on June 9 in hills, one plant to each hill. They were all frozen on August 25, with the exception of one variety which was protected, and which produced 16 pounds of fruit.

VARIETY AND STRAIN TESTS OF CUCUMBERS

Project 108.—Six varieties of cucumbers were tested. They were sown on the 16th of May in hills 6 feet apart each way and were thinned to one plant per hill. The results obtained were as follows:—

VARIETY TESTS WITH CUCUMBER

Variety	Ready for use	Yield from three hills	
		lb.	oz.
Improved Long Green.	Aug. 30	7	4
Early Russian.....	Aug. 30	7	0
Davis Perfect.....	Aug. 22	4	8
Prolific.....	Aug. 22	3	2
Giant Pera.....	Aug. 30	2	14
West Indian Gherkin.....	Aug. 30	—	13

Cucumbers do not grow to perfection in this district; apparently the climate is not suited to them. Judging from the repeated tests made, the Early Russian, Davis Perfect and Improved Long Green can be recommended.

VARIETY AND STRAIN TESTS OF KOHL RABI

Project 109.—Three varieties of kohlrabi were seeded on May 5th in rows 30 inches apart and were later thinned to 4 inches apart in the row. The results obtained were as follows:—

VARIETY TESTS WITH KOHL RABI

Variety	Ready for use	Yield from 30 foot row	
		lb.	oz.
Early White.....	Aug. 4	38	—
Early Purple.....	Aug. 1	28	—
Green Vienna.....	Aug. 5	14	—

The Green Vienna did not prove very satisfactory, and results would indicate that it cannot be recommended. This vegetable must be used in the early stages of maturity; otherwise it becomes tough and stringy.

VARIETY AND STRAIN TESTS OF LETTUCE

Project 82.—Eleven varieties of lettuce were tested in 1921. They were seeded on May 4th in rows 15 inches apart and later thinned to 4 inches apart in the row. Unfortunately the record of the yield was not kept. The type and earliness are as follows:—

VARIETY TESTS WITH LETTUCE

Variety	Type	Ready for use	Remarks
All Heart.....	Cabbage.....	June 20	Good
Grand Rapids.....	Loose leaf....	June 20	Good
Black Seeded Simpson.....	Loose leaf....	June 20	Good
Earliest Wayahead.....	Cabbage.....	June 22	Does not stand dry weather
Crisp as Ice.....	Cabbage.....	June 25	Stood drought well, quality good
Iceberg.....	Cabbage.....	June 25	Good quality
Sutton Early Paris Market O. 845.....	Cabbage.....	June 25	Early seeder
Improved Hanson.....	Loose leaf....	June 27	Good
New York.....	Cabbage.....	June 27	Fair
Salamander.....	Cabbage.....	June 30	Good
Cos.....	Cos.....	July 4	Good table kind

VARIETY AND STRAIN TESTS OF MUSKMELONS

One variety, Extra Early Hackensack, was grown this year. The seed was sown in cold frames on May 16, transplanted out in hills on June the 9th, and came into bloom July 24. While some fruit set, none matured before the killing fall frosts.

VARIETY AND STRAIN TESTS OF ONIONS

Project 82a.—Eleven varieties of onions were tested in 1921. They were seeded on May 3 in rows 30 inches apart, and were later thinned to 2 inches apart in the row. They were all harvested on September 10th, except White Barletta, which was harvested on July 24th. The results were as follows:—

VARIETY TESTS WITH ONIONS

Variety	Type	Yield from 30 foot row		Remarks
		lb.	oz.	
Southport White Globe.....	White Globe.....	30	8	Very good quality
Yellow Globe Danvers.....	Yellow Globe.....	27	0	Good shape and size
Large Red Wethersfield O. I. 4.....	Red flattish.....	25	8	Good quality
Prize Taker.....	Yellow Globe.....	24	0	Too late maturing
Red Wethersfield.....	Red Flattish.....	22	0	Fair quality
Yellow Globe Danvers O. 49-54.....	Yellow Globe.....	21	0	Fair quality
Ailsa Craig.....	Straw Color Oval.....	21	0	Fair quality
Southport Yellow Globe.....	Yellow Globe.....	20	0	Very good quality
Red Australian Brown.....	Red Flattish.....	18	6	Excellent texture
Extra Early Red Flat.....	Red Flat.....	17	0	Poor quality
White Barletta.....	Small White Pickling...	12	0	Good quality

The past season was an ideal one for the growing of onions from seed. One of the most uniform crops with respect to size and good texture in the history of the Station was harvested.

The Southport Red Globe, Southport White Globe and the Red Australian Brown all had excellent quality. The latter is rather small in size, but very solid and a good keeper.

COMPARISON OF METHODS OF PROPAGATING ONIONS FROM SEED

The growing of onions from seed sown in the hotbed and afterwards transplanted to the open, as compared with seed sown directly in the open, has been carried on for several seasons. Prior to this year, the transplanted sets always gave the highest yield. This season, however, as shown in the following table, those sown directly into the open gave the highest yields.

Variety	Sown in Open	Sown in Hotbed
Red Wethersfield.....	lb. 80	lb. 40
Yellow Globe Danvers.....	65	45
Extra Early Red.....	40	32

COMPARISON OF DIFFERENT SIZES OF ONION SETS

The object of this experiment is to ascertain which size of onion set will produce the largest crop of merchantable onions. The results obtained were as follows:—

Size of Set	Yield from 30 foot row
Quarter inch set.....	lb. 29
Half inch set.....	27
Three-quarter inch set.....	23

The smaller sets produced the largest yields of onions. The larger sets run to seed to a greater degree than the smaller ones. The above results might be changed if the flowering stem of the onions was removed.

VARIETY AND STRAIN TESTS OF PARSLEY

Project 82b.—Two varieties of parsley were seeded on May 3rd and were ready for use by July 1. Both made an excellent growth and were apparently of equal merit.

VARIETY AND STRAIN TESTS OF PARSNIPS

Project 110.—Only one variety of parsnip, Hollow Crown, was grown the past season. It was seeded on May 3 and was ready for use on September 4. The yield from one 30-foot row was 27 pounds.

COMPARISON OF SOME DISTANCES AT WHICH TO THIN PARSNIPS

The Hollow Crown only was used in this experiment. It was seeded on May 3 in rows 30 inches apart, and thinned to 2, 3 and 4 inches apart in the row.

Distance apart	Yield from 33 foot row
2 inches.....	lb. 36
3 inches.....	32
4 inches.....	30

The closest planting usually produces the best quality roots.

VARIETY AND STRAIN TESTS OF GARDEN PEAS

Project 85a.—Eighteen varieties of peas were grown in 1921. They were sown in rows 3 feet apart on April 30. The results obtained were as follows:—

VARIETY TESTS WITH PEAS

Variety	Length of Vine		Date ready for use	Yield from 30-foot row	
	ft.	in.		lb.	oz.
Manifold.....	2	6	July 7	21	15
Laxtonian.....	1	6	" 12	20	14
Sherwood.....	2	6	" 14	20	14
Reliance.....	3	—	" 22	20	12
McLean Advancer.....	2	9	" 13	18	4
Early Morn.....	3	6	" 7	17	12
Pioneer.....	2	6	" 11	17	12
Danby Stratagem.....	2	6	" 21	17	10
Richard Seddon.....	2	—	" 13	17	3
Little Marvel.....	2	—	" 12	15	12
Gradus.....	4	—	" 7	15	10
Homesteader.....	2	6	" 20	13	9
Eldorado.....	1	8	" 12	13	0
Gregory Surprise.....	2	6	" 9	13	0
Western Beauty.....	1	7	" 7	12	9
Eight Weeks.....	1	6	" 7	12	2
American Wonder.....	2	—	" 13	7	10
Stevenson.....	2	—	" 16	4	12

Western Canada seems to be admirably adapted for the growing of peas. Good results have always been obtained at this Station. Among the best varieties are Thos. Laxton, Little Marvel, Laxtonian and Stratagem, the last mentioned being one of the best late maturing varieties.

LATE AND EARLY MATURING VARIETIES VS. DIFFERENT DATES OF SEEDING FOR A CONTINUOUS SUPPLY OF GREEN PEAS

Four standard varieties, which include both late and early maturing, were compared with different dates of sowing a good standard variety.

VARIETIES vs. DIFFERENT DATES OF SEEDING

Variety	Date of Sowing	Date ready for Use	Yield of Green Peas 50-ft. Row		Yield of Ripe Peas 50-ft. Row	
			lb.	oz.	lb.	oz.
Gradus.....	April 27....	July 7....	22	7	5	4
Advancer.....	" 27....	" 16....	16	4	3	8
Danby Stratagem.....	" 27....	" 20....	16	8	4	—
Thos. Laxton.....	" 27....	" 4....	22	—	5	12
"	May 4....	" 7....	35	—	6	4
"	" 11....	" 13....	34	12	4	6
"	" 18....	" 17....	36	8	4	6

Sowing one variety at different dates produced a larger and more continuous supply of green peas for table use.

VARIETY AND STRAIN TESTS OF PEPPERS

Project 111.—Two varieties, Harris Earliest and Red Chili, were grown in 1921. They were seeded in the hotbeds April 22 and were transplanted into the garden on June 9. Harris Earliest was the only one that produced fruit, 10 oz. being picked before the plants were killed by fall frosts. It is doubtful whether this plant will ever be grown with pronounced success in this district.

VARIETY AND STRAIN TESTS OF POTATOES

Project 112.—Since this Station was started in 1907, 67 varieties and strains of potatoes have been tested. A large number of these proved unsuitable for the district and were discarded, while new varieties are being added each year. In 1921, 29 varieties were under test. These were planted on May 25 and harvested on September 22. They were planted in rows 30 inches apart and the sets were dropped 12 inches apart in the row. The sets were cut to average 2 oz. in weight. The results obtained were as follows:—

VARIETY TESTS WITH POTATOES

Variety	Colour	Per cent marketable	Yield per Acre
			Bush. Lb.
Table Talk.....	White.....	92	569 48
Empire State.....	White.....	90	514 48
Houlton Rose.....	Red.....	86	506 ..
Duchess of Norfolk.....	White.....	82	503 48
Burnaby Mammoth.....	Spotted pink.....	88	492 48
Early Norther.....	Red.....	78	468 12
Country Gentleman.....	Pink.....	90	464 12
King Edward VII.....	Pink eye.....	92	458 37
American Wonder.....	White.....	83	458 37
Ashleaf Kidney.....	White.....	92	457 31
Early Hebron.....	Pink.....	86	427 49
Wee MacGregor.....	White.....	92	407 ..
Irish Cobbler.....	White.....	83	391 36
King George.....	White.....	90	383 10
Carter Early Favourite.....	White.....	76	378 24
Epicure.....	Pink Eye.....	74	374 ..
Gold Nugget.....	White.....	82	367 24
Extra Early Eureka.....	White.....	88	367 24
Duke of York.....	White.....	86	358 36
Gold Coin.....	White.....	86	341 ..
Green Mountain.....	White.....	92	330 ..
Early Ohio.....	Red.....	74	314 36
Dalmeny Regent 0-7181.....	White.....	88	310 12
Dalmeny Hero 0-7198.....	White.....	84	297 ..
Dominion.....	White.....	85	282 20
Moreton 0-8349.....	White.....	86	281 16
Dalmeny Regent 0-8320.....	White.....	75	200 12
Brydon.....	White.....	64	110 ..
Dalmeny Hero 0-8347.....	White.....	76	102 18

Sixteen varieties have been grown for each of the last five years. Empire State, a variety which has been grown for the past five years only, heads the list for that period with an average yield of 404 bushels and 35 pounds per acre.

AVERAGE YIELD OF POTATOES FOR THE YEARS 1917 TO 1921 INCLUSIVE

Variety	Maturity	Yield per Acre
		Bush. Lb.
Houlton Rose.....	Medium early.....	401 17
Table Talk.....	Late.....	388 44
Early Hebron.....	Medium late.....	374 12
American Wonder.....	Medium late.....	363 36
Duchess of Norfolk.....	Late.....	363 13
King Edward VII.....	Late.....	354 12
Country Gentleman.....	Medium Late.....	330 40
Carter Early Favourite.....	Medium early.....	326 55
Ashleaf Kidney.....	Late.....	325 22
Epicure.....	Medium late.....	322 31
Irish Cobbler.....	Medium early.....	320 19
Burnaby Mammoth.....	Late.....	313 43
Gold Coin.....	Medium late.....	307 20
Extra Early Eureka.....	Early.....	303 36
Wee MacGregor.....	Medium late.....	303 25
Duke of York.....	Medium early.....	244 10

The question of the most suitable variety of potatoes for this district is a debatable one. Many of the varieties which stand near the top in yield are late in maturing, and, although they are of marketable size, are lacking in table quality because of their immaturity. For that reason, when one year with another is considered, commercial growers would do well to choose one of the early varieties such as the Irish Cobbler or the Early Ohio.

VARIETY AND STRAIN TESTS OF PUMPKINS

Project 112.—Three varieties of pumpkins were tested in 1921. They were seeded on May 16 in the cold frames and were transplanted out into hills 9 feet apart each way on June 9. The weight of ripe fruit on each variety was as follows:—

VARIETY TESTS WITH PUMPKINS

Variety	Date of Blooming	Yield from 3 hills
		Lb.
Connecticut Field.....	July 17.....	97
Small Sugar.....	July 19.....	56 •
King of Mammoths.....	July 19.....	20

Owing to the frost on August 25, which came at the critical stage of their development, the crop of pumpkins this year was not as good as usual. The growing of pumpkins in this district is always accompanied by risk; however, one is always with a few, and a fair crop can be assured with a little extra care and attention.

VARIETY AND STRAIN TESTS OF RADISHES

Project 82c.—Four varieties of radish were tested. They were sown on May 4. No yields were recorded. The results were as follows:—

VARIETY TESTS WITH RADISHES

Variety	Ready for use	Quality
Scarlet Turnip White Tip (Lennoxville).....	June 3.....	Fair.
Scarlet Turnip White Tip (Dupuy & Ferguson).....	June 3.....	Fair.
French Breakfast.....	June 4.....	Excellent.
White Icicle.....	June 7.....	Good.

White Icicle and French Breakfast were the best varieties, as they appear to stand the dry weather better than the turnip types.

VARIETY AND STRAIN TESTS OF RHUBARB

Project 87.—The yields of ten varieties were recorded in 1921. The results obtained were as follows:—

VARIETY TESTS WITH RHUBARB

Variety	Year Planted	Date ready for use	Yields from 1 Hill	
			Lb.	Oz.
Daw Champion.....	1911	May 21....	21	8
Early Raspberry.....	1911	" 20....	16	—
Hobday Giant.....	1911	" 18....	19	—
Linnaeus.....	1911	" 18....	12	8
Monarque.....	1911	" 18....	18	—
Paragon.....	1911	" 21....	16	—
Prima Donna.....	1911	" 22....	18	—
Early Scarlet.....	1911	" 18....	17	—
Prince Albert.....	1911	" 18....	23	—
Victoria.....	1912	" 17....	25	—

Among the best varieties are Victoria, Daw Champion, Early Raspberry and Early Scarlet. The Plantation is an old one, and the yields are not as large as they would be with younger plants.

VARIETY AND STRAIN TESTS OF SALSIFY

Project 113.—One variety of salsify, Long White, was grown in 1921. It was seeded on May 4 and was ready for use by August 30. One 30-foot row yielded 8 pounds.

VARIETY AND STRAIN TESTS OF SPINACH

Project 82d.—Two varieties of spinach were tested in 1921. They were seeded on May 4. Victoria was ready for use on June 4 and produced 4 pounds, while New Zealand was ready for use on June 12 and produced 12 pounds.

VARIETY AND STRAIN TESTS OF SQUASH

Project 114.—Five varieties of squash were tested in 1921. They were seeded on May 16 in hills 9 feet apart each way. The results obtained were as follows:—

VARIETY TESTS WITH SQUASH

Variety	Date ready for Use	Yield from 3 Hills
		Lb.
English Vegetable Marrow.....	Aug. 17....	158
Long White Bush.....	" 19....	86
Delicious.....	Sept. 9....	45
Hubbard.....	" 1....	42
Golden Hubbard.....	" 1....	20

Of the squash family, the Vegetable Marrow is the most reliable for this district. The Hubbard makes a fair showing in favourable seasons but should early frosts occur they are usually frozen before maturity.

VARIETY AND STRAIN TESTS OF TURNIPS

Project 83c.—Four varieties of turnips were grown in 1921. They were seeded on May 4 in rows 30 inches apart and were thinned to 4 inches apart in the row. The results obtained were as follows:—

VARIETY TESTS WITH TURNIPS

Variety	Date ready Use	Yield from 30-foot Row
Golden Ball.....	July 12....	37
Red Top Strap Leaf.....	" 3....	35
Early Snowball.....	" 2....	33
Early Purple Milan.....	" 7....	31

There is very little difference in the four varieties tested; all are about equal in quality. Early Snowball was fit for table use earlier than any of the others.

VARIETY AND STRAIN TESTS OF TOMATOES

Project 80.—Fifteen varieties of tomatoes were tested in 1921. They were seeded in the hotbed on April 21, transplanted to flats on May 18 and transplanted into the open on June 6. The last picking was done on September 8. The results obtained were as follows:—

VARIETY TESTS WITH TOMATOES

Variety	Weight of Green Tomatoes from 5 Plants
Alacritty Clipper 0-709.....	1b.
Alacritty 0-704.....	31
Burbank Early 0-732.....	28
John Baer (Carter).....	23
Alacritty x Earlibell 0-711.....	21
Earlibell 0-734.....	21
Danish Export 0-722.....	19
Red Head (Langdon).....	17
Danish Export (Wiboltt).....	15
John Baer 0-718.....	15
Bonny Best 0-719.....	15
First of All.....	14
Chalk's Early Jewel (Carter).....	13
Chalk's Early Jewel 0-710.....	11
Crimson Canner 0-717.....	10
	8

Of the 15 varieties tested, Chalk's Early Jewel (Carter), was the only one to ripen fruit before frost. This variety had one ripe fruit on August 27. There is no difficulty in growing tomatoes in this district, but it is difficult to ripen the fruit without frost injury. While very little fruit was matured, Alacritty appeared to be nearer maturity than any other variety.

COMPARISON OF METHODS OF TRAINING TOMATOES

Seventy-five plants each of Alacritty and Bonny Best were planted, 25 of each were set out in hills 4 feet apart each way; 25 were set out in rows 4 feet apart and 2 feet

apart in the row, tied to stakes and pruned to one stem; another 25 were planted in rows 4 feet apart and 2 feet apart in the row, trained to 3 wires and pruned to 2 stems. The results obtained were as follows:—

Method of Training	Alacritty			Bonny Best		
	Ripe fruit	Green fruit	Total fruit	Ripe fruit	Green fruit	Total fruit
	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.
Planted in hills 4 feet apart each way, and left unpruned.....	2 12	113 0	115 12	.....	100 0	100 0
Planted in rows 4 feet apart and 2 feet apart in the row, tied to stakes and pruned to one stem.....	7 8	42 0	49 8	0 8	38 6	38 14
Planted in rows 4 feet apart and 2 feet apart in the row, trained to 3 wires and pruned to 2 vines.....	6 15	74 0	80 15	6	39 14	40 4

The tomatoes ripened on the single stems produced the largest amount of ripened fruit. The Alacritty was superior to Bonny Best for this purpose. It would seem as though, for general farm practice, planting in the regular way will produce most satisfactory results. While tying to stakes and pruning to one stem considerably hastens maturity, the fruit is left exposed to the early autumn frosts. As these early frosts are usually followed by two or three weeks' warm weather, and, as they usually injure only the tips of the unpruned plants, the fruit is left uninjured. In many cases these unpruned plants will ripen considerable fruit before the succeeding frost, while the fruit on the plants tied up to the stakes and wires is badly injured by the first early frost.

FRUITS

That bush fruits can be grown successfully in districts where climatic conditions are similar to Lacombe has been proved conclusively. While the less hardy varieties have been a complete failure during years with adverse climatic conditions, a combination of correct cultural methods with a suitable variety will result in success.

Our bush fruit plantation is deriving considerable benefit from the protection afforded by the wind-breaks and hedges which have now reached the point of usefulness for which they were originally intended. Further the bees kept at this Station, by their assistance in the fertilization and cross-fertilization of the flowers of the different fruits, have been responsible to a certain extent for the excellent results obtained. The yields during the past year surpassed those obtained any previous season; in fact, the yields obtained from the best varieties compared favourably with those obtained in districts with a much milder climate.

VARIETY AND STRAIN TESTS OF APPLES

Project 76.—Considerable work has been done at this Station in testing different hardy varieties and strains of apples. So far, no variety or strain has proved hardy and productive enough to be considered a success. While some trees have produced fruit, producing a crop apparently lowers the vitality of the trees to such an extent, that, if the succeeding winter is a severe one, the tree always dies.

After being thoroughly summer-fallowed, part of the old orchard was replanted in the spring of 1921 with 25 strains of hardy apples and hybrid crabs. These have made good progress during the season. Those planted were as follows: Hoadly,

Moscow Pear, Pioneer x Northern Spy, Anis, Pioneer, Greensweet, Jewel x Telopsky, Robin, Eve, Tony, Jewel x Rideau, Rosilda, Antonovka, Piotosh, Silvia, Red Anis, Grand St. Jean, Hiberna, Rupert, Blushed Colville, Jewel x October, Ostrakoff Glass, Redman, Elsa, Charlamoff, Jewel x Yellow Transparent, Jewel.

While these trees were planted in a location well protected on all sides by an excellent hedge, further protection was given on the North side by planting a row of Manitoba Plums. These plums will furnish some valuable information as to the possibilities of this crop in this district.

VARIETY AND STRAIN TESTS OF BLACK CURRANTS

Project 77.—Nineteen varieties of black currants are under test. Among the heaviest yielders are Climax, Black Naples, Magnus, Eagle and Lee Prolific. Boskoop Giant and Buddenborg produce extra large berries but are not hardy and kill back badly in severe winters. Topsy is a good variety, and where high yields are a secondary consideration to fine large berries of good quality, this variety can be recommended.

ANNUAL YIELDS PER ACRE—BLACK CURRANTS

Variety	1917	1918	1919	1920	1921	Average yields
	lb.	lb.	lb.	lb.	lb.	lb.
Climax.....	6,100	491	8,671	11,545	7,856	6,934
Black Naples.....	2,218	88	8,066	8,305	8,470	5,429
Magnus.....	3,690	60	6,050	9,680	7,260	5,348
Eagle.....	4,033	163	8,066	7,032	7,260	5,310
Lee Prolific.....	3,031	176	3,529	9,881	8,470	5,017
Kerry.....	3,932	37	6,050	5,911	7,582	4,702
Saunders.....	1,243	176	6,050	5,482	6,118	3,813
Topsy.....	4,235	214	3,223	3,264	7,360	3,659
Clipper.....	2,218	252	3,075	7,070	5,117	3,546
Collins Prolific.....	3,125	252	5,848	2,218	3,404	2,969
Victoria.....	2,218	.....	3,630	5,331	3,630	2,961
Eclipse.....	1,310	.....	6,453	1,890	4,033	2,737
Boskoop Giant.....	50	.....	201	.....	453	140
						Two year averages
Ogden.....	.....	.....	.....	6,715	8,470	7,592
Ethel.....	.....	.....	.....	4,265	4,235	4,250
Merveille de la Gironde.....	.....	.....	.....	3,117	4,840	3,978
Monarch.....	.....	.....	.....	2,904	3,025	2,964
Bang Up.....	.....	.....	.....	1,315	4,486	2,900
Buddenborg.....	.....	.....	.....	.....	1,411	708

VARIETY AND STRAIN TESTS OF RED CURRANTS

Project 77a.—The yields of red currants obtained during the past season were the highest ever recorded in the history of this Station. Owing to the continued dry weather, much fruit dropped just as it was ripening. Nevertheless, some extraordinary yields were recorded, as will be noted in the Red Grape, Rankins Red and Perfection Varieties. The last-named variety is a fine large currant, but is less hardy than the two preceding ones. Champagne, Holland and Prince Albert have only been under test for two years, hence their average yields are not a fair comparison with the five year averages.

ANNUAL YIELDS PER ACRE—RED CURRANTS

Variety	1917	1918	1919	1920	1921	Average yields
	lb.	lb.	lb.	lb.	lb.	lb.
Red Grape.....	5,080	2,904	2,420	15,911	15,699	8,402
Rankins Red.....	726	151	.....	5,858	14,792	4,307
Pomona.....	1,694	726	1,210	7,365	9,559	4,110
Perfection.....	726	90	302	1,981	12,342	3,088
Red Dutch.....	242	.....	.....	3,040	7,653	2,187
Red Cross.....	272	196	121	2,359	7,291	2,047
Victoria Red.....	.....	.....	.....	2,087	5,566	1,530
Greenfield.....	105	.....	.....	2,875	4,356	1,466
Cumberland.....	.....	.....	.....	1,936	4,956	1,378
Wilder.....	.....	.....	.....	.....	1,992	398
						Two year average
Champagne.....	.....	.....	.....	7,713	16,698	12,205
Holland.....	.....	.....	.....	8,076	4,840	6,458
Prince Albert.....	.....	.....	.....	453	1,769	1,111

VARIETY AND STRAIN TESTS OF WHITE CURRANTS

Project 77b.—The three varieties of white currants under test did not produce any fruit during the years 1917, 1918, and 1919; and the yields given are the average of the years 1917 to 1921 inclusive. As was the case with the red currants, the yields obtained last year with the white currants were above the average. Of the three varieties tested, the White Cherry was the most satisfactory.

ANNUAL YIELDS PER ACRE—WHITE CURRANTS

Variety	1920	1921	5 year average yield per acre
	lb.	lb.	lb.
White Cherry.....	3,161	3,950	1,446
White Grape.....	862	2,298	632
Large White.....	574	1,752	465

VARIETY AND STRAIN TESTS OF GOOSEBERRIES

Project 77c.—The season's crop of gooseberries was much above the average. Houghton was the heaviest yielder in 1921. While this variety does not stand at the top in the five year average, it can be recommended as a standard commercial variety. Silvia, while not so productive, has very large fruit which is easily gathered.

Rust, in its earliest stages of development, was noticed on the fruit, but entirely disappeared after spraying with Bordeaux Mixture. The saw-fly was troublesome during the summer, and it was necessary to spray to keep it in check.

The yields obtained during the last five years were as follows:—

ANNUAL YIELDS PER ACRE—GOOSEBERRIES

Variety	1917	1918	1919	1920	1921	Average yield per acre
	lb.	lb.	lb.	lb.	lb.	lb.
Carrie.....	745	726	4,719	3,161	5,786	3,037
Oregon Champion.....	287	816	3,388	3,735	6,352	2,915
Houghton.....	816	1,946	2,420	2,283	7,160	2,874
Silvia.....	47	60	2,541	1,875	5,535	2,011
Pearl.....	30	242	968	726	968	586

VARIETY AND STRAIN TESTS OF STRAWBERRIES

Project 79.—Some considerable success has been attained in the growing of strawberries at this Station, and, although the yields last year were affected by the drought, very satisfactory results were obtained. The Senator Dunlap has proved to be the most satisfactory variety at this Station, as indicated in the following table, which gives the yields for the past five seasons.

ANNUAL YIELDS PER ACRE—STRAWBERRIES

Variety	1917	1918	1919	1920	1921	Average yields per acre
	lb.	lb.	lb.	lb.	lb.	lb.
Senator Dunlap.....	15,142	3,080	3,173	3,922	2,694	5,602
August Luther.....	8,068	2,585	3,049	3,459	2,239	3,880
Tennessee Prolific.....	1,685	1,686	528	1,207	1,539	1,329
Progressive.....	739	67	964	1,703	2,021	1,098

VARIETY AND STRAIN TESTS OF RASPBERRIES

Project 78.—Of the nine varieties of raspberries under test, Cuthbert gave the best results, followed by Herbert and Sarah. Sunbeam is very hardy and productive, but the fruit is rather small and tedious to pick. Miller, a variety that has been tried for the past five years, proved most unsatisfactory. While its hardness and yields are all that can be desired, the fruit is of such an insipid character that its value is considerably lowered. Golden Queen is a yellow variety. The fruit is very sweet and of a delicate flavour, but the yields are too light for commercial purposes. The following table gives the yields for the last five consecutive years:

ANNUAL YIELDS PER ACRE—RASPBERRIES

Variety	1917	1918	1919	1920	1921	Average yields per acre
	lb.	lb.	lb.	lb.	lb.	lb.
Cuthbert.....	2,193	2,212	1,391	2,738	3,245	2,355
Herbert.....	1,112	2,106	1,936	1,628	2,670	1,890
Sarah.....	975	1,402	1,278	1,941	2,303	1,579
Sunbeam.....	862	1,849	1,119	1,879	1,768	1,495
Early King.....	1,028	1,544	1,285	646	2,613	1,423
Marlboro.....	884	960	1,000	1,868	2,225	1,387
Chegwin.....	1,853	744	1,289	120	2,687	1,338
Miller.....	201	610	1,633	533	1,966	988
Golden Queen.....	952	627	428	.....	1,694	740

TREES AND SHRUBS

COMPARISON OF TREES AND SHRUBS FOR ORNAMENTAL PLANTING

Projects 71 to 73.—Farmers who are making permanent homes on the prairies are very interested in the different trees and shrubs which can be grown successfully, and which can be recommended for windbreaks as well as ornamental purposes. As this Station has one of the largest and oldest collection of trees and shrubs in the province, the following tables should be of considerable value to those contemplating the purchase of nursery stock for home planting.

EVERGREEN TREES

Botanical Name	Common Name	Remarks	Planted	Height
				Feet
<i>Picea pungens</i>	Blue Spruce.....	Hardy, beautiful tree.....	1909	12
<i>Picea canadensis</i>	Native White Spruce...	Very hardy.....	1909	24
<i>Picea mariana</i>	Black Spruce.....	Strong and vigorous.....	1909	18
<i>Picea excelsa</i>	Norway Spruce.....	Only partly hardy.....	1909	13
<i>Pinus contorta Murrayana</i>	Lodgepole Pine.....	Splendid tree.....	1909	13
<i>Pinus sylvestris</i>	Scotch Pine.....	Hardy, but too open.....	1909	17
<i>Pinus Banksiana</i>	Jack or Banksian Pine..	Hardy, but a poor tree.....	1909	10
<i>Pinus Montana Mughus</i>	Dwarf Mountain Pine...	Not a desirable type.....	1909	5
<i>Pinus Strobus</i>	White Pine.....	Not hardy.....	1909	8
<i>Larix leptolepis</i>	Japanese Larch.....	Beautiful foliage.....	1909	21
<i>Pseudotsuga taxifolia</i>	Douglas Fir.....	Not hardy.....	1909	4

DECIDUOUS TREES

				Feet
<i>Populus nigra</i>	Black Poplar.....	Very compact, hardy.....	1909	25
<i>Populus petrowskiana</i>	Russian Poplar.....	Vigorous, quick growing, suitable for windbreaks..	1917	16
<i>Ulmus americana</i>	American Elm.....	Hardy, splendid shade tree.	1909	18
<i>Acer Negundo</i>	Manitoba Maple.....	Not recommended, tree be- comes unsightly as it matures, suitable for plant- ing in interspaces of wind- breaks.....	1909	22
<i>Betula alba</i>	Silver Birch.....	Hardy, a beautiful tree.....	1909	17

ORNAMENTAL SHRUBS

<i>Cotoneaster tomentosa</i>	Rockspray.....	White flowers, scarlet berries.....	6
<i>Cotoneaster frigida</i>	".....	White flowers, scarlet berries.....	4
<i>Cotoneaster vulgaris</i>	".....	Pinkish flowers, scarlet berries.....	4
<i>Caragana pygmaea</i>	Siberian Pea Tree.....	Dwarf, pretty shrub, yellow flowers.....	3
<i>Caragana frutescens</i>	" ".....	Has large yellow flowers....	5
<i>Caragana arborescens</i>	" ".....	Large shrub, good for hedges or windbreaks.....	9-12
<i>Syringa vulgaris</i>	Lilac.....	Colour of blooms ranges from purple to white, sweet scented.....	4
<i>Syringa villosa</i>	".....	Very showy when in flower.	9
<i>Syringa Josikaea</i>	".....	Valuable for its late bloom- ing season.....	5
<i>Syringa amurensis</i>	".....	Flowers white in large clusters or panicles.....	6
<i>Lonicera tatarica</i>	".....	Flowers crimson to white, fruited.....	8
<i>Lonicera chrysantha</i>	".....	Flowers white, fruit bright red.....	8
<i>Spiraea Van Houttei</i>	Meadow sweet.....	Standard variety, white flowers.....	3
<i>Spiraea Billiardii</i>	".....	Long, narrow, dense panicles of flowers.....	3
<i>Spiraea japonica</i>	".....	Dwarf and compact, flowers in loose clusters.....	2
<i>Spiraea sorbifolia</i>	".....	A useful shrub.....	4
<i>Spiraea arguta</i>	".....	The first shrub to bloom, flowers white.....	2
<i>Rosa spinosissima</i>	Rose.....	Low bush, single white flowers.....	4
<i>Rosa rubrifolia</i>	".....	Leaves bluish green, hardy.	4
<i>Rosa rugosa</i>	".....	Flowers purple to white, blooms all season, hardiest of the roses, has bright red fruits.....	3
<i>Philadelphus Lemoinei</i>	Mock Orange.....	Flowers freely with delicate perfume.....	3
<i>Prunus grayana</i>	Bird Cherry.....	Flowers profusely in the spring.....	12
<i>Pyrus Aucuparia</i>	Mountain Ash.....	Clusters of scarlet berries are carried all winter.....	14

COMPARISON OF TREES AND SHRUBS FOR HEDGES

Hedges and windbreaks are a source of great interest to the farmers of this province. Twenty-eight different ornamental and utility hedges are under test at this Station. The following table gives a brief summary of their possibilities:—

TREES AND SHRUBS FOR HEDGES

Botanical Name	Common Name	Remarks	Height
			Ft. In.
<i>Acer tatarica</i> Ginnala.....	Ginnalian Maple.....	Loose leaved, very pretty.....	5 2
<i>Acer Negundo</i>	Manitoba Maple.....	Makes a serviceable hedge.....	5 7
<i>Amelanchier alnifolia</i>	Saskatoon.....	Ornamental.....	2 5
<i>Betula alba</i>	White Birch.....	Very promising.....	3 -
<i>Caragana arborescens</i>	Siberian Pea Tree.....	Excellent, pretty and useful.....	7 -
<i>Caragana frutescens</i>	Shrubby Caragana.....	Not recommended.....	3 -
<i>Caragana pygmaea</i>	Dwarf Caragana.....	Ornamental and low growing.....	2 -
<i>Cotoneaster acutifolia</i>	Rockspray.....	Kills back.....	2 8
<i>Cornus alba sibirica</i>	Siberian Dogwood.....	Too loose habit of growth.....	3 8
<i>Elæagnus argentea</i>	Wolf Willow.....	Makes a pretty hedge.....	4 6
<i>Lonicera tatarica</i>	Tartarian Honyuckle.....	A good hedge.....	4 6
<i>Neilia opulifolia aurea</i>	Ninebark.....	Ornamental only.....	2 10
<i>Picea canadensis</i>	Native White Spruce.....	Excellent hedge.....	5 9
<i>Pinus contorta Murrayana</i>	Lodgepole Pine.....	Pretty and useful hedge.....	6 3
<i>Populus nigra</i>	Black Poplar.....	Very promising.....	3 5
<i>Populus tremuloides</i>	Aspen Poplar.....	Very promising.....	2 -
<i>Rhamnus catharticus</i>	Common Buckthorn.....	Very slow growing.....	3 8
<i>Ribes aureum</i>	Missouri Currant.....	Not recommended.....	3 8
<i>Rosa rubrifolia</i>	Red-leaved Rose.....	Very ornamental.....	3 -
<i>Rosa rugosa</i>	Japanese Rose.....	Very ornamental.....	2 8
<i>Salix pentandra</i>	Laurel-leaved Willow.....	Excellent hedge.....	4 8
<i>Salix versones</i>	Golden Willow.....	Very good, kills back a little.....	5 2
<i>Shepherdia argentea</i>	Buffalo Berry.....	Very compact and pretty.....	4 -
<i>Syringa japonica</i>	Japan Lilac.....	Rather open.....	4 5
<i>Syringa villosa</i>	Chinese Lilac.....	Dense fine hedge.....	4 10
<i>Syringa Josikea</i>	Josika Lilac.....	Dense beautiful hedge.....	4 -
<i>Spiræa Van Houttei</i>	Spiræa (Meadow Sweet).....	Kills back to some extent.....	2 6
<i>Larix laricina</i>	Tamarack (Larch).....	Very promising.....	2 -
<i>Thuja Occidentalis</i>	White Cedar, Arbor-vitæ.....	Slow growing but pretty.....	1 9
<i>Viburnum lantana</i>	Wayfaring Tree.....	Slow growing.....	2 9

Caragana arborescens is the best deciduous hedge for this district, or for situations with a climate similar to that of Lacombe. It is quite hardy, erect and compact in habit of growth, and its foliage is a bright dark green colour which makes it very attractive during the spring and summer. This hedge at the present time has reached a height of seven feet.

The second in order of merit among the deciduous shrubs for hedges would be *Syringa villosa* (lilac). It is quite hardy, grows fairly quickly, and when in bloom is very attractive. This shrub, to obtain density, should not be planted too closely.

Salix laurifolia (Laurel Leaved Willow), and *Salix voronish* (Golden or Russian Willow) make attractive and quick-growing hedges, but their life seems to be of briefer duration than the Caraganas. Owing to the limbs and individual shrubs dying, they become patchy, and in a few years become open at the bottom. However they are a useful hedge, and as they naturally grow in moist places, if planted in such a location might last indefinitely. The Laurel Leaved Willow is the hardier of the two, as the Golden Willow will kill back to the snow line in a severe winter.

Native Spruce (*Picea aba*) makes an excellent hedge and is one of the best in every possible way. It needs very little trimming when once well established, and it can be trained to any desired height. A hedge planted in 1911 and kept trimmed to a height of five feet six inches, and which is still in good condition, is a splendid example of what may be done with this hedge in the West.

Box Elder or Manitoba Maple (*Acer Negundo*), is a very strong-growing hedge and makes an effective protection from the wind. It has not a very neat appearance and is somewhat objectionable for ornamental purposes, but under many conditions it can be used to advantage as a windbreak.

Two native shrubs which do well and make desirable hedges are Buffalo Berry (*Shepherdia argentea*) and Wolf Willow (*Elaeagnus argentea*). The latter, with its fragrant flowers in spring and its glistening silver foliage in the summer, makes it a very attractive and ornamental hedge. Its chief drawback is the suckering of the roots, which, if not carefully watched, may get out of control.

Four hedges of local trees have recently been planted, viz:—Silver Birch (*Betula alba*), Aspen Poplar (*Populus tremuloides*), Native Larch (*Larix laricina*) and Saskatoon (*Amelanchier alnifolia*). These are all making good progress, and should make very satisfactory hedges.

FLOWERS

Project 70.—Owing to the hot, dry season, the display of some kinds of flowers was rather disappointing. Nevertheless it was clearly demonstrated that, even under adverse climatic conditions, flowers will make a creditable showing and will add much to the appearance of any landscape.

VARIETY AND STRAIN TESTS OF ANNUAL AND PERENNIAL FLOWERING PLANTS

The season was very hard on the perennials. Owing to the extremely dry weather during the latter part of the growing period, the flowering season was much shorter than usual. The Paeonies, Iris, Iceland Poppies, and Delphinium or Larkspurs made a good show of bloom, but many of the others failed to come up to their usual standard.

Hardy and half-hardy annuals are a very useful addition for the continuation of flowers after the season of the perennials has passed.

Cosmos, Petunias, Stocks, Nicotiana, Balsam, Salpiglossis, Dimorphotheca, Zinnia, Antirrhinum, Bartonia, and Shirley Poppy were among our best annuals this season. Several varieties of Asters were tried, but all failed to give satisfactory results.

The following table gives in detail the flowering of the most suitable annuals. The half-hardy kinds were seeded in the hotbed and afterwards transplanted, and the hardy kinds were sown directly in the open where they are intended to bloom.

VARIETY TESTS OF ANNUAL FLOWERS

Name	Date Sown	Position	Began to Bloom	Full Bloom
Antirrhinum.....	April 27	Hotbed...	Aug. 1	Aug. 18
Balsam.....	" 27	"	July 30	" 7
Calendula.....	May 9	Open.....	" 27	" 20
Candytuft.....	" 9	"	" 19	" 12
Cosmos.....	April 27	Hotbed...	June 27	" 6
Dimorphotheca.....	" 27	"	July 14	" 17
Linaria.....	May 9	Open.....	" 23	" 15
Lobelia.....	April 27	Hotbed...	" 23	" 16
Nasturtium.....	May 9	Open.....	" 21	" 12
Nemesia.....	April 27	Hotbed...	" 27	" 14
Nicotiana.....	" 27	"	" 2	" 13
Petunia.....	" 27	"	" 7	" 9
Phlox.....	" 27	"	" 23	" 31
Salpiglossis.....	" 27	"	" 19	" 12
Stocks.....	" 27	"	June 30	" 12
Tagetes (Marigold).....	" 27	"	" 30	" 1
Zinnia.....	" 27	"	" 24	July 18

Sweet peas need no introduction. Their fragrance combined with their delicate colouring make them one of the most popular of our annuals. While the dry season during the past year retarded their growth, they nevertheless gave a magnificent display of bloom throughout the season. Seventy-three varieties and strains were tested; all of which gave satisfaction. The following list comprises those which were considered to be the most outstanding for colour, length of stem and all round usefulness.

VARIETY TEST IN THE SWEET PEAS

Variety	Colour	Remarks
Queen Victoria.....	Rose flush.....	Large flower, fine colour.
Elfrida Pearson.....	Pale pink.....	Vigorous grower.
The President.....	Orange scarlet.....	Long stems, large flowers.
Agricola.....	Lilac blush.....	Beautiful colour.
Blue Monarch.....	Blue.....	Strong grower.
Mrs. Rontzahn.....	Pink on cream ground.....	Free flowering.
King Manoel.....	Rich maroon.....	Large flowers.
Loyalty.....	Violet on white ground.....	Large flowers on long stems.
Rosina.....	Rose.....	Lovely shade, free flowering.
Pink Beauty.....	Delicate pink.....	Very free flowering.
Prince George.....	Rosy lilac.....	Distinctive colouring.
Irish Belle.....	Flushed pink.....	Large flower of fine form.
Cherub.....	Ivory white edged with rose.....	Strong grower with large blooms.
Phantom Blue.....	Opalescent blue.....	Very distinct.
Constance Oliver.....	Mauve on creamy white.....	Large beautiful blooms.
Mrs. Cuthbertson.....	Deep pink on creamy ground.....	Beautiful colouring and free flowering.
Decorator.....	Rich rose.....	Very distinct.
Mrs. A. G. Gentle.....	White edged blue.....	Beautiful shade.
Hallmark Pink.....	Rosy pink flushed salmon.....	Strong and free flowering.
Mrs. Tom Jones.....	Light blue.....	Good colour.
Daisybud.....	Rose pink on white ground.....	Very beautiful.
Constance Hinton.....	Snowy white.....	Excellent variety.
Elegance.....	Soft silvery pink.....	Beautiful colouring.
King White.....	Snowy white.....	Very large blooms.
Hercules.....	Rose pink.....	Large and fine form.
Florence Nightingale.....	Soft lavender.....	Long stems and large flowers.
Helen Stapylton.....	Pink and cream.....	Free flowering and good form.
Royal Purple.....	Rich purple.....	Large bloom with distinct colouring.
Jean Ireland.....	Creamy buff edged with rose.....	Vigorous grower.
John Ingram.....	Deep rose and carmine.....	Good form.
Albert Watkins.....	Lavender.....	Large blooms.
Thos. Stevenson.....	Salmon scarlet.....	Brilliant colouring.
Lady Grisel Hamilton.....	Pale lavender.....	Very pretty.
Queen Alexander.....	Vivid crimson scarlet.....	Very handsome.

The cultural methods followed at Lacombe might be of assistance to those who grow a number of individual varieties and wish to keep them separate. A group system is practised. The seeds are sown in circles of about eighteen inches in diameter and trained to cylindrical wire frames or guards. These should be pegged down with stakes on each side to keep them from being blown down or shifted out of position. Ordinary poultry netting is ideal material for making these frames.

CEREALS

The results obtained in the cereal test plots during the past season have been most satisfactory. The plots were very uniform in height and a perfect stand was obtained.

Judging from the number of inquiries received as to the high yields obtained at this Station, an explanation is in order.

In variety tests it is essential to keep the plots as free from impurities as possible. To do this, it is necessary to avoid the possibility of any volunteer grain coming up in the plots. As the season in this district is too short to permit the

shattered grain which has fallen to the ground to be germinated and destroyed the same year, it is necessary to seed the test plots on land which has been either summer-fallowed or in a hoed crop the previous year. Land which has been summer-fallowed is preferred. In addition to this, there is a four-foot path between each plot and a roadway along each end. As the outer edges of the plots draw moisture and plant food from this path and roadway, they must be considered when accounting for the high yields per acre. While the yields are high, it must be borne in mind that each plot has received exactly the same treatment, and the comparative yields, although high, are a true indication of the value of the variety for grain production.

VARIETY AND STRAIN TESTS OF SPRING WHEAT

Project 21.—Since this Station was started in 1907, 49 varieties and selections of common spring wheat and 4 varieties of durum spring wheat have been grown in the test plots. These include all the standard varieties and a number of selections developed by the Dominion Cerealists at the Central Experimental Farm, Ottawa. A large number of these varieties and strains did not prove worthy of being continued in the test plots, and were discarded.

During the past season 25 varieties and strains were under test. All wheats were sown April 28. The following table presents the yields of the named varieties.

VARIETY TESTS WITH WHEAT

Variety	Date of Ripening	Days to Mature	Average Length of Straw including Head	Strength of Straw on Scale of 10 points	Yield of Grain per Acre	Weight per Measured Bushel after Cleaning
			Inches		bush. lbs.	Pounds
Red Bobs, Supreme.....	Sept. 3	128	44	10	66 40	62
Red Bobs, Early Triumph.....	" 1	126	44	10	59 40	61.5
Huron, Ottawa 3.....	" 2	127	46	9	59 ..	63
Bishop, Ottawa 8.....	" 1	126	44	8	58 25	60
Bobs.....	" 2	127	42	10	58 20	61
Red Bobs.....	" 3	128	43	10	55 10	62.5
Marquis (Dom. Chem.).....	" 3	128	47	10	54 20	64
Early Red Fife, Ottawa 16.....	" 4	129	45	10	52 40	60
Kitchener.....	" 7	132	44	10	49 50	61
Marquis (Lacombe).....	" 8	133	44	10	49 ..	62
Kubanka, Ottawa 37.....	" 10	135	52	5.5	45 40	60
Ruby, Ottawa 623.....	Aug. 28	122	43	10	43 20	64
Prelude, Ottawa 135.....	" 22	116	37	9	32 40	62

One year's results do not indicate the true value of a variety. For that reason, the 5, 4, and 3-year average yields, presented in the following table are a more authentic indication of the comparative value of the different varieties.

Variety	Five-year Average, 1917-1921		Four-year Average, 1918-1922		Three-year Average, 1919-1921	
	bush.	lbs.	bush.	lbs.	bush.	lbs.
*Marquis, Ottawa 15 (D.C.).....	52	56	52	45	53	40
Huron, Ottawa 3.....	51	58	52	7	52	30
Bishop, Ottawa 8.....	51	21	50	1	50	28
Bobs.....	47	54	45	47	47	3
†Marquis, Ottawa 15 (Lacombe).....	45	8	43	55	44	33
Red Bobs.....			51	27	50	50
Ruby, Ottawa 623.....			42	10	42	40
Early Red Fife, Ottawa 17.....					48	7
Kitchener.....					47	17

*Marquis D.C. is from seed provided by the Dominion Chemist.

†Marquis (Lacombe) is from seed grown at Lacombe.

As the above experiments were conducted in duplicate, the 5-year averages are the result of 10, the 4-year averages 8, and the 3-year averages 6 different experiments.

It will be noticed that the Marquis Ottawa 15 heads the list in the 5-year average. This variety is an outstanding plot. It is very uniform in type, height, colour of chaff and grain. The straw is medium long and strong. The head is medium long, pointed, and bald with a few short awns in some instances. The chaff is straw-yellow in colour and holds the kernels so closely that complete separation is sometimes difficult. The seed is medium in size, very heavy, rather short and blocky, and of a dark red colour.

Huron Ottawa 3, which comes second on the list, is a bearded wheat with brown chaff and rather open head. The straw is medium in length and fairly strong. The grain is only fair in milling and baking quality, which, together with the fact that it is bearded, puts it in a class below Marquis.

Bishop Ottawa 8 is a white or amber coloured wheat. It has no beards, and has a white or straw coloured chaff. As it is a white wheat it will not meet with favour in the grain trade.

Bobs is a white wheat and lacks the uniformity of type that Marquis has. This, added to the fact that it is not a high yielder, will prevent it from becoming a popular variety.

Ruby Ottawa 623 is seven to ten days earlier in maturing than Marquis. This variety is recommended for districts subject to early fall frosts where Marquis is not a sure crop. It has medium fine straw which stands up well. The head is medium long, bald and tapers at the tip. The glumes are white (with touches of red) in colour; and they do not hold the kernel closely, which makes the variety a little inclined to shatter when fully ripe. The kernels are red, flinty, of medium length and size and produce flour of fair milling and baking qualities.

Prelude is the earliest of any of the varieties tested at this Station. It has a short, rather weak straw; and short, bearded, and rather open heads. The grain is of a dull reddish colour and shatters very easily.

Red Bobs is a bald wheat. The heads are of medium length and fairly compact. It has yellow chaff and a medium short, red, plump kernel. Perhaps its greatest fault is its lack of uniformity in type of head and height of straw. While a good yielder, it is superior in no way to Marquis. This, with its lack of uniformity, will prevent it ever taking first place among wheat varieties.

Early Red Fife is a selection from Red Fife which was made by the Dominion Cerealists. While it is an improvement on the original Red Fife, it is not superior in any way to Marquis.

Kitchener is a selection from Marquis made by the Dr. Seager Wheeler of Rosthern, Sask. It is identical with Marquis in nearly every way, and, as it is not superior to the parent variety in any particular, it may possibly soon lose its identity.

VARIETY AND STRAIN TESTS OF OATS

Project 21a.—Sixty-one varieties and strains of oats have been tested at this Station. These have been gone over carefully each year and undesirable types discarded until only 8 varieties and one strain were under test in 1921. The results of the variety tests presented in the following table are the average of duplicate plots, all of which were seeded on April 29.

VARIETY TESTS WITH OATS

Variety	Date of Ripening	Days to Mature	Average Length of Straw including Heads	Strength of Straw on Scale of 10 points	Yield of Grain per Acre	Weight per Measured Bushel after Cleaning
			Inches		bush. lbs.	Pounds
Irish Victor.....	Aug. 25	118	53	10	139 14	47
Banner, Ottawa 49.....	" 23	116	52	9	131 31	44
Leader.....	" 29	122	50	8	125 30	45
Gold Rain.....	" 21	114	52	10	124 4	46
Victory.....	" 28	121	51	9	120 ..	47
Tartar King.....	" 21	114	48	9	91 26	44
Daubeney, Ottawa 47.....	" 7	100	40	9	80 15	37
Liberty, Ottawa 480.....	" 13	106	47	9	58 23	52 (hulless)

A more complete comparison can be drawn from the three, four and five-year averages of the yields which are presented in the following table:—

Variety	Five-year Average, 1917-1921	Four-year Average, 1918-1921	Three-year Average, 1919-1921
	bush. lbs.	bush. lbs.	bush. lbs.
Banner, Ottawa 49.....	114 15	111 18	105 13
Irish Victor.....	107 2	106 11	101 13
Victory.....	99 12	95 27	89 12
Gold Rain.....	99 8	92 ..	87 32
Tartar King.....	88 27	83 27	72 17
Daubeney, Ottawa 47.....	75 11	69 20	63 6
Liberty, Ottawa 480.....		52 19	42 28
Leader.....			97 30

For the production of commercial grain, farmers can make no mistake in growing Banner oats. It is considerably earlier than the Irish Victor, the next highest yielder, and, in the five, four and three-year averages, yields decidedly heavier than either Victory or Gold Rain. There is very little difference in the maturity of Banner, Victory and Gold Rain. While Victory is gaining popularity throughout the seed trade, it is apparently doing this on the qualities of the seed for exhibition purposes. The kernels of Victory are a little shorter and plumper than Banner, while the Victory weigh slightly more per bushel and are a more attractive sample. This appears to be the only point in which Victory is superior to Banner.

Tartar King is a short, plump-kernelled, thick-hulled variety, and belongs to the mane or side oat type. The straw is coarse and brittle and will break when beaten down by storms. This is an undesirable variety of oats and cannot be recommended.

Daubeney Ottawa 47 is our earliest maturing variety. It has fine straw of medium length and strength. The kernels are long, slim and thin-hulled, but the seed does not weigh heavily per bushel. This variety can be recommended for localities that are subject to early fall frosts where the heavier yielding, later maturing varieties do not produce good results.

Liberty Ottawa 480 is a new hulless variety originated by the Dominion Cerealists. It is one of our earliest maturing varieties, but does not yield as heavily as the standard hulled varieties. It is valuable for feeding chickens, young pigs, or any class of livestock where oat hulls are objectionable. This variety should be cut before it becomes fully mature, or it will shatter badly.

Leader is a new variety which is being widely advertised by certain commercial seed growers and seedsmen. It does not appear to have any special advantage over Banner, and is a lower yielder.

VARIETY AND STRAIN TESTS WITH BARLEY

Project 21b.—Since this Station was started, 64 varieties and strains of barley have been tested. Of these, 40 were 6-rowed and 24 were 2-rowed. They include all the standard varieties as well as a number of strains developed by the Dominion Cerealists.

During the past season 17 varieties and strains were under test. The following table presents the yields of the named varieties under test in 1921. All plots were sown on April 30.

VARIETY TESTS WITH BARLEY

Variety	Date of Ripening	Number of Days Maturing	Average Length of Straw including Heads	Strength of Straw on Scale of 10 points	Yield of Grain per Acre	Weight per Measured Bushel after Cleaning	Remarks
			Inches		bush. lbs.	Pounds	
Barks.....	Aug. 26	118	35	7	94 18	52	6 rowed.
Gold.....	" 25	117	37	7	80 ..	58	2 rowed.
Trebi.....	" 20	112	38	10	74 28	53	6 rowed.
Manchurian, Ottawa 50.....	" 18	110	45	10	70 ..	53	6 rowed.
Himalayan, Ottawa 59.....	" 8	100	35	9	70 ..	65	6 rowed, hulless.
O.A.C. No. 21.....	" 16	108	46	9	67 34	54	6 rowed.
Stella, Ottawa 58.....	" 12	104	47	10	67 ..	53	6 rowed.
Duckbill, Ottawa 57.....	" 22	114	41	10	59 18	55	2 rowed.
Early Chevalier, Ottawa 51.....	" 6	98	47	10	45 20	53	2 rowed.
Success.....	" 4	96	40	9	30 45	51	6 rowed hooded. 30 per cent damaged.
Albert, Ottawa 54.....	" 3	95	37	10	41 32	51	6 rowed.

Seven of these varieties have been grown for five years, one for four years, and one for three years. The average yields for these periods are presented in the following table:—

Variety	Five-year Average		Four-year Average		Three-year Average	
	bush.	lbs.	bush.	lbs.	bush.	lbs.
Barks.....	86	24	86	47	78	43
Gold.....	80	4	79	3	69	1
O.A.C. No. 21.....	71	46	72	47	66	36
Guymalaye (Himalayan, Ottawa 59).....	64	11	63	25	53	28
Manchurian, Ottawa 50.....	62	29	64	17	55	38
Stella, Ottawa 58.....	62	23	63	30	55	38
Success.....	46	42	48	33	43	36
Duckbill, Ottawa 57.....			62	8	49	25
Early Chevalier, Ottawa 51.....					42	2

While Barks barley heads the list in yield per acre, it cannot be recommended for all Alberta conditions. It is the latest maturing variety under test, hence the length of the growing season must be considered by those in a district subject to early fall frosts. It is one of the shortest strawed varieties, and would not be suitable for dry districts where this might interfere with harvesting. It is one of the weakest strawed varieties, and under favourable conditions for lodging would be hard to harvest. It appears to be more susceptible to disease than the standard varieties, such as Manchurian; for that reason, if grown in a humid climate, the yield might be seriously reduced by disease.

Gold is a two-rowed variety. It is fairly late in maturing and has a rather short, fine, weak straw. While it has yielded slightly more grain per acre, this variety cannot be recommended in preference to standard varieties such as Manchurian or O. A. C. No. 21.

Guymalaye is a 6-rowed, hulless variety. Himalayan, a selection of Guymalaye made by the Dominion Cerealists, is now grown instead of the parent variety. This is one of our earliest and most promising selections. Although it has short straw when its hulless characteristic and high yielding qualities are considered, there may be certain conditions where this variety might be used to advantage.

O. A. C. No. 21 and Manchurian Ottawa 50 varieties need no introduction. They are standards by which other varieties of barley are compared. With O. A. C. No. 21 is leading Manchurian in the 5-year averages, a pure line selection of Manchurian is now being grown which apparently will outyield the O. A. C. No. 21. For the general barley crop to be grown over a wide range of conditions this Station unhesitatingly recommends either the Manchurian or the O. A. C. No. 21 variety.

VARIETY AND STRAIN TESTS OF FIELD PEAS

Project 21c.—Twenty-five varieties and strains of field peas have been tested at this Station. These include standard varieties as well as a number of selections made by the Dominion Cerealists. A large number of these did not prove suitable for the district and have been discarded. Early maturity is one of the essential characteristics in a suitable variety for this district, and this was the main disqualification in the varieties discarded. The named varieties under test in 1921 produced the following results. All plots were sown April 29.

VARIETY TESTS WITH FIELD PEAS

Variety	Date of ripening	Number of days maturing	Average length of vine	Yield of grain per acre	Weight per measured bushel after cleaning
				bush. lb.	
Early White Saskatchewan.....	Aug. 31	124	46	72 30	68
Arthur Ottawa 18.....	Sept. 9	133	52	63 ..	67
Solo.....	Sept. 6	130	52	62 ..	63
Bangalia.....	Sept. 1	125	54	60 40	67
Golden Vine.....	Sept. 4	128	44	59 30	67
Chancellor Ottawa 26.....	Aug. 30	123	49	40 41	69*

*A portion of plot lost in threshing.

Early White Saskatchewan is one of the most promising varieties under test. It possesses three of the essential characteristics of a suitable variety for this district in that it is a heavy yielder, is an early maturing variety, and is a small seeded variety, does not split as much when threshed as the larger seeded varieties.

The Chancellor variety is also very promising. It apparently has all the commendable features that the Early White Saskatchewan is credited with. In addition to this, it is slightly earlier. Unfortunately, no authentic yields are available from last year, owing to a mishap at the time of threshing.

FORAGE CROPS

ENSILAGE CROPS

VARIETY TESTS OF CORN FOR ENSILAGE

Project 50.—Nine varieties of corn were tested in 1921. They were planted on summer-fallowed land on May 21, and harvested on September 2. They were all immature when harvested, the yields obtained were as follows:—

VARIETY TESTS WITH CORN FOR ENSILAGE

Variety	Average height		Yield per acre	
	ft.	in.	tons	lb.
Longfellow.....	7	0	15	1,020
Comptons Early.....	7	2	14	776
North Western Dent.....	5	10	13	1,456
Wisconsin No. 7.....	6	0	13	1,192
White Cap Yellow Dent.....	6	4	13	1,060
Yellow Flint.....	5	0	12	1,872
Leaming.....	7	4	12	308
North Dakota.....	6	2	12	44
Bailey.....	6	0	9	480

VARIETY TESTS OF SUNFLOWERS FOR ENSILAGE

Project 48.—Five varieties of sunflowers were grown in 1921. They were planted on May 21 in rows 36 inches apart, were thinned to 8 inches apart in the row, and were harvested on September 17. The results obtained were as follows:—

Variety	Height		Maturity	Yield per acre	
	ft.	in.		tons	lb.
Dr. Saunders Early.....	7	0	Early milk...	18	1,820
Friesian.....	5	0	Ripe.....	9	1,520
Early Ottawa 76.....	6	3	Milk.....	14	975
Early (Lethbridge).....	6	6	Firm dough...	16	1,855
Mammoth Russian.....	7	6	Bloom.....	21	1,530



Cultivating sunflowers in an 18.5 acre field. Note the comparatively thick seeding which prevents the crop growing too high, making it easier to handle both in the field and at the cutting box.

In considering these varieties it will be noticed that there is considerable correlation between the yield and the stage of maturity; that with an increased yield there is a corresponding increase in the number of days required for maturity. In this district late maturing varieties, such as the Mammoth Russian, seldom reach the stage of maturity when all the plants are in bloom. However it is doubtful if the increased food value resulting from the more advanced maturity of the earlier varieties will compensate for the extra tonnage of the more immature late varieties. In handling the sunflower crop, it has been considered good farm practice to let the main sunflower crop, if immature, wilt in the field before cutting it into the silo.

FIELD ROOTS

Owing to a misunderstanding which resulted in the different seed companies delivering the root varieties too late for seeding, and as there are not enough roots grown in the district to justify local seed dealers carrying these different varieties in stock, it was impossible to obtain seed for root variety tests, except with those which were already on hand or which were forwarded from the Central Experimental Farm.

VARIETY TESTS WITH SWEDES

Project 53a.—The swedes in the general farm crop as well as in the variety tests produced excellent yields, as indicated in the comparative yields. The results obtained in the variety tests were as follows:—

Variety	Source of seed	Yield per acre	
		tons	lb.
Monarch.....	Nappan.....	20	1,316
Ditmars Swede.....	Kentville.....	28	628
Suttons Champion.....	Charlottetown.....	22	748

Ditmars Swede, a pale yellow-fleshed variety, leads the other two in yield.

VARIETY TESTS OF SUGAR BEETS

Project 53b.—It will be noticed that the yields of the sugar beet varieties are low; also, that there is not a wide variation in the different yields. The yields are not a true indication of the comparative value of these different varieties, as climatic conditions were such that a poor stand was obtained. The seed germinated quite satisfactorily, but after the young plants had reached a height of about two inches, we had a severe wind storm which, aided by the 9.6° of frost which occurred on May 28, killed many of the young plants and resulted in an imperfect stand. The results obtained were as follows:—

Variety	Yield per acre	
	tons	lb.
Chatham.....	6	1,332
British Columbia.....	5	1,220
Waterloo.....	5	164

POULTRY

The great number of inquiries received with regard to poultry during the past year is a fair criterion of the interest taken in poultry in Alberta. It is expected this interest will increase very largely, as there is still a great scope for increasing the number of hens, turkeys, geese and ducks, as well as building up good flocks and improving on the flocks of the present. It was impossible to supply the demand for cockerels during the past year. All the White Wyandotte and Barred Rock cockerels were sold early in the winter, and many copies of the Alberta Poultry Breeders Directory were sent out to correspondents asking for the names of breeders within the Province. There has also been an increased interest in turkeys and ducks, especially the latter, and a number of good young Pekin drakes have been sold as stock birds.

THE PLANT

A great deal of improvement has taken place in the poultry plant during the past year. A number of the houses have been remodelled and fixed up with glass and cotton fronts. The two main poultry houses have had cement floors put in, and a complete set of new trap nests has been installed. A movable colony house has been moved and remodelled to make a second brooder house, and two new No. 18 Buckeye coal-burning stoves are being installed. This new brooder house will double the number of chicks that can be handled this year over the previous years.

THE STOCK

The poultry at the Station consists of 116 White Wyandotte pullets and 50 two-year-old hens, 47 Barred Rock pullets and 16 two-year-old hens, and 56 single-combed Rhode Island Red Pullets. There are 23 breeding males of the different breeds. In addition, there are 9 African and Toulouse geese and 11 Pekin ducks.

At present, there are the three varieties of hens, but the White Wyandotte strain has proved superior to the other two breed strains, and it is planned next year to keep only the White Wyandottes, as it is possible to do much better breeding work where only the one variety is kept with which to work.

Commencing in April, 1922, individual pedigree work is being undertaken at this Station, and there is some excellent foundation stock to commence with. There are a number of two-year-old hens which made a two hundred egg record or better last year, and they will be the foundation for the pedigree work.

WHITE WYANDOTTES

The following are some of the best records completed in 1921:—

Hen number	Yearly egg record
55	222
66	216
52	210
60	207
57	200
56	186
64	180

EXPERIMENTAL WORK

Because of the numerous changes in the buildings and the constant work put on the remodelling of them, very little experimental work has been possible, other than the pedigree breeding.

WINTER EGG PRODUCTION OF WHITE WYANDOTTE, BARRED ROCK AND S.C.
RHODE ISLAND RED POULTRY NOV. 1, 1921, TO MAR. 31, 1922

Project 115

	White Wyandottes		Barred Rocks		S.C. Rhode Island Reds
	Hens	Pullets	Hens	Pullets	Pullets
Total number of days.....	151	151	151	151	151
Number of hens or pullets.....	50	116	16	47	56
Total number of eggs laid.....	608	4,202	198	1,206	980
Average number of eggs per hen.....	12.1	36.2	12.3	25.6	17.5
Total value of eggs at 40c. per dozen..... \$	20 27	140 06	6 60	40 20	32 66
Average value of eggs per hen.....	0 40	1 20	0 41	0 85	0 44

COST OF RAISING GREEN DUCKS FOR TABLE USE

Project 116.—In the summer of 1921 an experiment in feeding young ducks was tried out with the object of finding out the profitableness of growing ducks for the green market in August. These ducks were fed for the first four weeks on a mixture of boiled mashed potatoes and shorts mixed with buttermilk. At the end of the four weeks, the potatoes were discontinued, and they received only a mash made of shorts moistened with buttermilk. The cost per head to raise these ducks averaged 31 cents, and at the end of six weeks they averaged 4.0 pounds, each making an average cost of 7.75 cents per pound to raise. As dressed, green ducks at that age were selling at 43 cents a pound, these ducks showed a remarkable profit.

SHIPPING DAY-OLD CHICKS VS. HATCHING EGGS

Project 117.—An experiment with shipping baby chicks and hatching eggs was carried out between the Experimental Station at Saanichton, B.C. and Lacombe, Alberta. On March 25, 100 baby chicks were received from Saanichton. One chick was dead on arrival, 46 died within the first two weeks, and a total of 41 were raised to maturity. A second lot from a later hatch arrived May 12. Two chicks were dead on arrival, 62 died within the first two weeks, and a total of 28 were raised. The second shipment must have received less attention in transit, as it was quite warm weather when they were shipped.

On April 19, 100 hatching eggs were received. 46 chicks were hatched and a total of 30 were raised to maturity. A direct comparison cannot be made, because it is not known how many eggs were set to hatch the 200 chicks sent as baby chicks. However, on the basis of a hatch equal to the hatch of the eggs received, it would have taken 100 eggs to hatch 46 chicks, and with the same percentage of loss as the average loss of the 200 chicks received, a total of 16 chicks per 100 eggs set would have been raised. Therefore, better results would have been obtained from hatching eggs shipped rather than shipping as baby chicks. In all probability, a greater hatch would have been obtained from eggs hatched at Saanichton, because a number of weak germs are certain to have been lost in shipping the eggs, and these figures are not very satisfactory. Furthermore, the distance from Saanichton to Lacombe is too great to expect good results from shipping baby chicks, as it is at least a 36-hour trip. Much better results would be expected from shipping baby chicks shorter distances.

VARIOUS METHODS OF PRESERVING EGGS

Project 118.—In June, 1921, two dozen fertile and two dozen infertile eggs were packed according to the following methods and stored in a cool dry cellar:

Methods of Packing

1. Salt Brine.—Salt in the water until an egg just floated.
2. Lime water.—Two pounds lime to five gallons of water.
3. Salt.
4. Lime.
5. Oats.
6. Barley.
7. Bran.
8. Wrapped in paper.

9. Water-glass.—One pound of water-glass to three quarts of water. The water was first boiled to destroy all germ life, cooled before adding the eggs, then tightly covered to prevent evaporation.

1. Salt brine.—Eggs from salt brine were used in December, 1921. The yolks were so hardened as to be unfit for use. The whites were very watery, and the eggs were so salty that they could only be used in combination with fresh eggs.

2. Lime water.—Eggs from lime water were used in December, 1921. The shells were discoloured and brown, the yolks adhered and the eggs tasted of lime.

3. Salt.—Eggs packed in salt were used in January, 1922. The salt had absorbed so that the eggs tasted. The yolks, though usable, had congealed to a greater extent than in the other dry methods.

4. Lime.—Eggs packed in lime were used in January, 1922. These eggs tasted of lime quite strongly.

5 and 6. Oats and barley.—Eggs were used in February, 1922. In both these methods, a greater proportion of spoiled eggs was found than in any other method. A larger proportion of fertile eggs than of the infertile eggs spoiled.

7. Bran.—Eggs packed in bran were used in March, 1922. The result was similar to other dry methods. The eggs had a stale odour, adhering yolks and a few spoiled.

8. Wrapped in paper.—Eggs wrapped in paper were used in March, 1922. The yolks were very yellow and adhered to the shell. The eggs had a stale odour, and could only be used for cooking.

In the above eight methods, the yolks became a very dark yellow in colour, and adhered more or less to the shell. The whites of the eggs, though more watery than in fresh eggs, would still beat to a froth.

9. Water-glass.—Eggs in water-glass were used in April, 1922. The yolks appeared in their natural colour. The whites of the eggs were watery, and would not beat to a froth. These eggs were satisfactory for boiling, though the shells were very brittle. To prevent bursting in cooking, the eggs should be pricked with a pin in the large end.

This last method has proved most satisfactory where the eggs are carried over the hot months of the summer. They retain their fresh taste, and cook well. The only change was found in the whites of the eggs, which did not beat up in to a froth for cooking purposes.

The results obtained from lime water are not in accord with the experimental work conducted at the central farm at Ottawa and reported on in "Interim Report" for year ending March 21, 1921. The results there gave lime water first place among seven preservatives.

BEEES

THE SEASON

The past season, when considered from a bee-keeper's standpoint, was not ideal, and the resulting honey flow was less than it might have been had climatic conditions been more favourable.

The bees were removed from the cellar on April 15. During the balance of the month there were 124.1 hours sunshine, and while there were three different flurries of snow and rain, there were only two days on which the sun did not shine. On the whole, the weather was quite seasonable and could be considered favourable for bees.

The month of May had 28 days of sunshine, aggregating 229.1 hours, with 1.69 inches precipitation which fell in the first two weeks. This made conditions favourable for the bees to collect pollen from the abundance of willow and poplar which grows in this district, and which is in bloom at this season. The result was that during this period the colonies were considerably strengthened by the development of young brood.

June had an aggregate precipitation of 1.85 inches, which fell on 8 different days. Showers on the 7, 17 and 30 averaged 0.5 inch each, while the others were only light. There were only 4 days during which the sun did not shine for at least 5 hours, and on these days 2.1 hours was recorded. This made the month of June the driest on record, with the result that the usual abundant supply of wildflowers was limited and the honey flow below normal.

July was the most favourable month of the season. While it rained on 18 days out of the 31, there was only one day on which the sun did not shine. The precipitation for the month amounted to 3.275 inches and the sunshine aggregated 302.6 hours. For the 7 days June 30 to July 6 inclusive, 1.84 inches of rain fell. This freshened all vegetation and had a beneficial effect on the honey flow. The local showers which pass over the district at this season cause the plants to bloom and increase the secretion of nectar, and in this way increase the flow of honey.

August was unfavourable for honey production. The .78 inch precipitation fell in 7 different showers. As .58 inch of this fell on the 10th, practically arid conditions prevailed during the balance of the month. All vegetation became parched. This was followed by 3.6 degrees of frost on the 26th, which killed all bloom.

The dry weather which prevailed during August continued throughout September, with the exception of the 8th and 9th, when 1.35 inches of rain fell. Although the bees collected enough honey to feed themselves and their brood during this period, the real honey flow ended on August 26.

SPRING AND SUMMER PROTECTION

The apiary was situated in an ideal location during the past season. The bees were protected on the windward side by a long building, and were further protected on all sides by hedges and clumps of shrubs. They were given additional protection with Kootenay cases. This excellent protection may be responsible for the fair yields obtained under rather adverse climatic conditions.

WINTERING

Six colonies were put in the bee-cellar in the autumn of 1920. From these, five strong colonies were removed in the spring, two of the weaker ones being united to make one good strong colony.

INCREASE

During the summer two of the strongest colonies were split up for increase. This made seven colonies that went into winter quarters. Two of the new colonies were queened with queens of special breeding, bred by the Dominion Apiarist, and mated on Duck Island, Ont. It is the intention to compare the prolificacy, non-swarmling and honey-producing qualities of these queens with those bred in the Station apiary.

HONEY PRODUCTION

Project 20.—The total honey production from the five colonies from which honey was extracted amounted to 275 pounds, or an average of 55.2 pounds per colony; the highest production from a single colony being 76 pounds.

INDIVIDUAL PARTICULARS, COLONIES

Number of colony	Number of combs covered by bees			Weight extracted honey produced
	June 1	July 1	Aug. 1	
7	6	7	9	76
3	4.5	6	8	61
5	5	6	8	54
1	4	5	6	45
4	4	5	6	40

SUMMARY OF PROFIT AND LOSS ACCOUNT

By two colonies increase at \$20.. .. .	\$ 40 00
276 pounds honey at 30 cents.. .. .	82 80
one pound wax at 50 cents.. .. .	50
	<u>\$123 30</u>
To one colony lost during winter at \$20.. .. .	\$ 20 00
apiary labour, April to November.. .. .	39 70
40 pounds honey fed at 30 cents.. .. .	12 00
35 pounds sugar fed at 10.5 cents.. .. .	3 67
interest on investment, \$150 at 6 per cent.. .. .	9 00
profit.. .. .	38 93
	<u>\$123 30</u> <u>\$123 30</u>

Profit per colony, \$7.78.

GENERAL FARM NOTES

NEW BUILDINGS AND ALTERATIONS

During the year, a combined pump-house and winter tractor shed was erected, with an upper story for sleeping quarters for men. This building is 24 by 37 feet and will house the equipment for pneumatic water system, pump, air compressor, motor and two horizontal steel tanks, 6 by 24 feet, with approximately 10,000 gallons storage capacity. This system will supply water for the whole institution with sufficient reserve for fire protection.

The second story of the dwelling at the poultry plant was lathed and plastered and divided into three rooms. This, with the removal of a partition on the ground floor, makes a very comfortable residence for the poultryman. The boarding house was completely renovated, and the office was calso-mined throughout. The putting in of large storage cabinets in the office had made room for the systematic arrangement of the steadily increasing number of publications of the Experimental Farms and Department of Agriculture.

IMPROVEMENTS TO GROUNDS

A new roadway has been constructed for entrance to the grounds at the south-east corner, where the residence for the first assistant to the superintendent was built last year. This driveway and the widening of the driveway leading to the office greatly improve the appearance of the grounds, and many more farmers now drive through than formerly. As the double rows of Manitoba maple and ash trees planted along the front of the grounds had proven to be only semi-hardy and were in very bad condition, they were removed and the ground broken up. The strip will this summer be thoroughly cultivated, to kill all grasses, and in 1923 a row of alternate spruce and Russian poplar trees will be set out.

EXTENSION AND PUBLICITY

During the year, the superintendent addressed nine meetings of farmers and stock breeders, and judged live stock, vegetables and seed grain at three fairs. An educational exhibit was taken to seven summer fairs in the province. A carload of fat sheep was shown at the Edmonton Spring Show. There were five wethers of each of the six breeds in the sheep experiment, and five of the original range ewes, dams of some of these wethers. This exhibit well illustrated the grading-up experiment with sheep, and attracted a great deal of attention and favourable comment.

ADDITIONS TO THE STAFF

In September, 1921, Mr. C. R. Bradford, B.S.A., a graduate of Macdonald College, was appointed as second assistant to the superintendent. Mr. Bradford's work will be mainly in connection with the live stock at the Station.